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Attainable Standards in the Bacterial Counts of Raw and Pasteurized Milk*

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THE study summarized in this paper was made under the following circumstances:

The community surrounding an important state hospital had never had adequate official supervision over the milk supply. All herds in the county had been subjected to the tuberculin test, but few if any were entirely free from infection with Brucella. In fact, Brucella had been isolated from most of the raw milk examined. The commercially pasteurized milk available drew its supply from unsupervised producers, and the bacterial counts often were exceedingly high.

To meet this situation until a more adequate solution was possible, the Children's Hospital improvised a procedure, using a large water-bath to pasteurize milk in bottles. The milk thus pasteurized showed wide fluctuations in bacterial counts, and the dangers of contamination made it urgent that a modern plant be installed. A few months after the organization of a University Department of Health, it became possible to install such a plant and to carry out sanitary inspection of the producing farms as well.

The department took the position that there is not, nor can there be, any such thing as a constantly safe raw milk supply. It held further that the pasteurizing of high count raw milk, however adequate the pasteurization process, could not make such milk desirable for consumption by babies. The least that could be aimed at was Grade A raw milk which had been pasteurized.

On any strict interpretation there were no Grade A dairies in the community. The dairy from which the raw supply was then being received was better than most, but it was decidedly not entitled to a Grade A rating. It was necessary, therefore, to develop such dairies. Unfortunately, financial conditions made it impossible for the university to pay more than the prices locally paid for the higher grades of milk. The chief advantages

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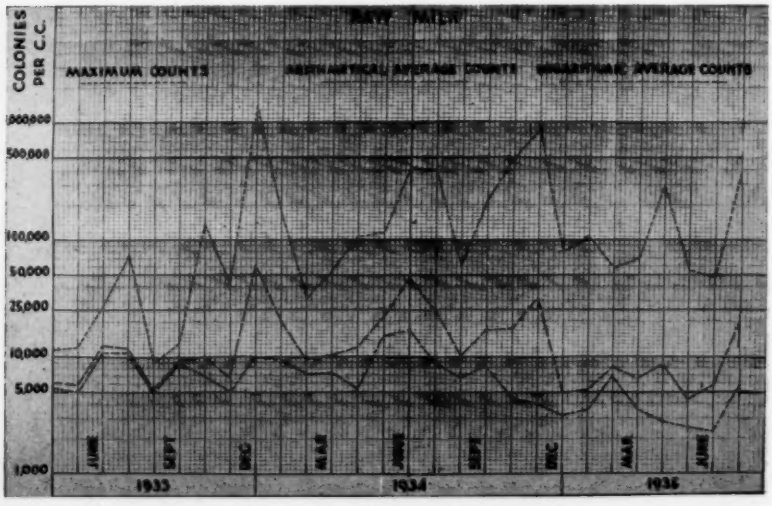
it could offer were stability of market, and freedom from surplussing.

As an example of the general conditions, one of the dairy farms which was later selected may be cited. This producer had been selling so-called Grade A raw milk in the city. On inspection the flanks of the cows were found to be caked with mud and manure, the barn floor was entirely concealed by a closely packed layer of manure several inches in depth, the walls and ceilings of the barn were heavily coated with dust-laden cobwebs, no water was available in the barn, and the milk house was in a poor state of repair. The lower portion of the barn lot was so muddy that the cows mired down if they ventured into it, and a huge accumulation of manure existed within shoveling range of the barn door. It was a grade D dairy. However, a survey showed that beneath the manure was a good concrete floor. The milk house could easily be put into good shape. The installation of water could be economically accomplished. The herd was free from tuberculin reactors, and had only 3 reactors to Brucella.

All that this dairy needed was a producer with a desire and will to remedy its defects. This producer himself said, "All I need is sanitation. If you will show me how, I will do everything required." On inquiry, it was found that he could be depended upon to fulfil his word. In spite of the extremely black picture painted by the inspector as to the requirements, this producer desired to undertake the task. These details are mentioned to show that low bacterial counts are within the reach of almost any dairy which is willing to accept such attainments as an objective. Incidentally, the dairy just described has established the best record thus far made by those in the group herein considered.

The Standard Milk Ordinance was used as a basis for the contracts, but in addition the dairies were required to carry out anything regarded as necessary by the University Department of Health. In correcting defects, first things were placed first, and unremedied

FIGURE I



defects were compensated for temporarily by more rigid efforts along other and more important lines. From the beginning, bacterial counts have been used, not for establishing grades under the ordinance but, primarily, as a means of detecting the development of mastitis and of checking upon the adequacy of the sanitary measures employed.

ATTAINABLE STANDARD FOR BACTERIAL COUNTS IN RAW MILK

Under the Standard Milk Ordinance the maximum standard for Grade A raw milk is set at a logarithmic average of 50,000 per c.c. Occasional high counts cannot be avoided, and the use of logarithmic averages provides a fair means of evaluating the total milk production. Experience over 43 months shows, however, that a logarithmic average of 50,000 is very lenient.

During this period the counts on raw milk ranged from 100 to 1,400,000 per c.c., yet the monthly logarithmic average never reached 50,000. In only 2 months did it exceed 25,000, and in only 4 months did it exceed 10,000 (Figure I). During the last 13 months the monthly logarithmic average never reached 10,000, and it exceeded 5,000 in only 4 months. Thus, a monthly logarithmic average of 5,000 per c.c. seems well within the possibility of attainment.

In this connection it is important to remember that bacterial counts are dependent upon conditions within and without the udder. The trauma which is inseparable from milking favors the development of acute or chronic mastitis and this makes it practically impossible to secure bacteria-free milk. If external conditions are completely controlled, what is the lowest bacterial range which conditions within the udder make possible?

Dorner [1] drew milk aseptically from 132 apparently healthy dairy cows and found that the bacterial counts ranged from 530 to 4,390, the arithmetical average being 2,775 per c.c. In the present studies, specimens were collected from 198 cans of milk produced by a herd of 19 cows. During the first 8 days specimens were taken daily from each can received at the plant. During the following 10 weeks, the specimens were collected weekly. Over this entire period the bacterial counts ranged from 100 to 19,000 per c.c. The arithmetical average was 1,600 and the logarithmic average 1,000 per c.c. This record was made under actual production conditions, the milk being tested as received at the plant. Consequently, it is fair to use it as a basis for determining a zone in which adverse conditions within and without the udder are operative at what is practically their lowest level. For this purpose an arithmetical count of 2,000 per c.c. has been adopted as the upper limit of the ideal zone. All counts above this level indicate a corresponding increase in the factors within or without the udder.

TABLE I

CLASSIFICATION OF BACTERIAL COUNTS IN RAW MILK

Class	*Bacterial Range*	*Interpretation*
I	Under 2,000	Ideal
II	2,000 to 4,900	Excellent
III	5,000 to 9,900	Good
IV	10,000 to 24,900	Fair: Inquiry
V	25,000 to 49,900	Something wrong: Investigate
VI	50,000 to 99,000	Poor: Investigate
VII	Over 100,000	Bad: Investigate

TABLE II

CUMULATIVE PERCENTAGE DISTRIBUTION OF RAW MILK ACCORDING TO BACTERIAL COUNTS

Class	Range of Individual Bacterial Counts	Period Ending July 31 1932 7 Mo.	1933 12 Mo.	1934 12 Mo.	1935 12 Mo.
I	Under 2,000	3.3	0.4	1.8	32.2
I- II	Under 5,000	25.5	24.9	32.8	67.9
I-III	Under 10,000	49.9	64.3	66.8	83.9
I- IV	Under 25,000	76.5	92.3	81.0	93.9
I- V	Under 50,000	84.3	95.4	90.4	97.5
I- VI	Under 100,000	87.8	98.1	95.3	98.7
VII	Over 100,000	12.2	1.9	4.7	1.3
Total specimens examined		90	261	509	1,829
Producing farms		1	1	3	3

In attaining and maintaining low bacterial counts it has been found useful to set up a classification to serve as a goal for the producers, as shown in Table I.

Bearing in mind the conditions under which this work was initiated, it is of interest to observe to what extent the producers have been able to bring their product into Groups I and II which is the goal constantly held before them. The results of 43 consecutive months ending July 31, 1935, are shown in Table II.

All specimens for examination were collected at the plant, iced, delivered to the laboratory between 10 and 11 A.M., and plated in the early afternoon. The plate method, described in *Standard Methods of Milk Analysis*, has been used exclusively. It is recognized that this method is not sufficiently accurate to measure minor deviations. Nevertheless it may be of interest to record the distribution of bacterial counts in Class I, as found in Table III.

THE USE OF MAXIMUM BACTERIAL COUNTS IN EVALUATING PASTEURIZED MILK

The Standard Milk Ordinance uses a logarithmic average of 30,000 per c.c. as a basis for classifying Grade A pasteurized milk. It should be borne in mind that pasteurization is the final factor of safety and that the milk is now ready for distribution to the consumer. There is an inconsistency involved in permitting any high count milk to slip past this final barrier. Inasmuch as the counts indicate viable organisms, it would be logical to judge pasteurized milk not by its arithmetical or logarithmic averages, but by its *maximum* bacterial counts.

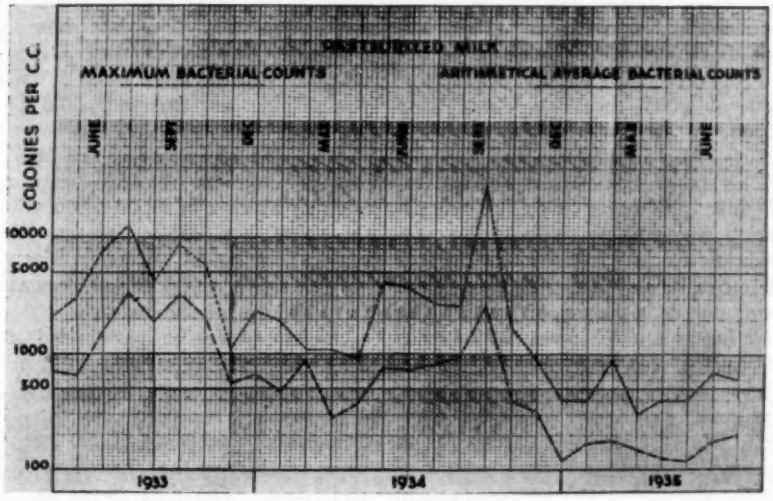
The studies herein summarized cover two periods of 15 and 28 months, respectively. During the first period, the pasteurization was done by an improvised method. The raw milk had

TABLE III

DISTRIBUTION OF BACTERIAL COUNTS BELOW 2,000 PER C.C. IN RAW MILK

Bacterial Count	Number of Specimens
1,000 to 1,900	412
Under 1,000	191
Total	603
900	37
800	27
700	26
600	29
500	23
400	22
300	16
200	7
100	4

FIGURE II



bacterial counts ranging from 1,000 to 690,000, the arithmetical average being 30,300 and the logarithmic average 10,000 per c.c. The pasteurized milk showed bacterial counts ranging from 100 to 118,000, the arithmetical average being 2,200 per c.c. In so far as average counts go, this was a very good record. However, 29.8 per cent of the specimens were above 5,000 in bacterial count.

During the second period of 28 months, the milk was handled in a small but modern pasteurizing plant under a well trained operator. The raw milk had bacterial counts ranging from 100 to 1,400,000, with an arithmetical average of 12,500 and a logarithmic average of 4,400 per c.c. In 1,323 specimens of pasteurized milk examined, the range of bacterial counts was from 100 to 13,000, the arithmetical average being 840 per c.c. The distribution of these counts is shown in Table IV.

TABLE IV

DISTRIBUTION OF BACTERIAL COUNTS IN PASTEURIZED MILK

Range	*Percentage of Total Specimens*
Under 300	52.4
Under 600	68.5
Under 1,000	78.0
Under 2,000	90.1
Under 5,000	97.9
Under 10,000	99.5
Under 25,000	100.0

Throughout the entire 28 months, the monthly arithmetical average bacterial count has exceeded 1,000 only 6 times; the highest being 3,400 per c.c. The *maximum* counts on individual specimens have exceeded 10,000 but twice, 5,000 only 5 times, and in 9 of the 28 months they have been well below 1,000 per c.c. During the final 9 consecutive months, the maximum count on any specimen has been 900, and in 5 of the 9 months has been below 500 per c.c. (Figure II). This performance has resulted practically in establishing 1,000 per c.c. as the standard for the *maximum* bacterial counts, that is, it marks the upper level of the ideal zone. If any specimens reach 2,000 per c.c. the operator and inspector try to find out what is the

matter. No importance is attached to such minor changes, but the only way to maintain low counts is to hold before those responsible a definite standard of excellence toward the attainment of which they may direct their efforts.

SUMMARY

This paper summarizes the studies of milk production over 43 months during which a raw milk supply was being developed under somewhat adverse conditions. Bacterial counts were used, not as a means of grading the milk but as a check upon the influence of mastitis and environmental factors. Under actual production conditions, raw milk was delivered to the plant from May 16 to July 31, with an arithmetical average bacterial count of 1,600, the individual counts ranging from 100 to 19,000 per c.c. On the basis of this performance a bacterial count of 2,000 was regarded as the upper limit of an ideal zone within which mastitis and environmental factors are reduced to the minimum. All counts in excess of this level are regarded as indicative of the operation of one or both of these factors. A classification on this basis provides a guide as to these factors and a goal for the producer. The data show that during the last 12 months, 32.2 per cent of the raw milk from 3 dairies was within this ideal zone, and 83.9 per cent was under 10,000 in bacterial count. The experience of the final 12 months indicates that a logarithmic monthly average of 5,000 seems within the possibility of attainment. The physical equipment of these dairies was such as can be developed at reasonable expense in any community.

Similar studies in pasteurized milk led to the rejection of both arithmetical and logarithmic averages, and the use of maximum bacterial counts as the criterion of excellence, 1,000 per c.c. being regarded as the upper limit of the ideal zone. The data show that this ideal zone was maintained during the final 9 months, the highest count found being 900 per c.c. During 5 of the 9 months, the maximum counts failed to exceed 500 per c.c.

REFERENCE

1. Dorner, W. The Bacterial Flora of Aseptically Drawn Milk. *Tech. Bull. 165*, July, 1930. New York State Agri. Exper. Sta., Geneva, N. Y.

Some Epidemiological Aspects of Chronic Endemic Dental Fluorosis*

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THE endemic hypoplasia of the permanent teeth known in this country as mottled enamel was first reported by Eager[1] in 1901. The first investigation in the United States was the extensive one of Black,[2] and McKay,[3] published in 1916. At present in this country alone there are more than 200 areas where endemic mottled enamel has been confirmed by survey; in addition there are approximately 100 areas where the endemicity has been reported but not confirmed by survey. These approximate 300 areas are distributed among 23 different states.

The incidence of affection in an endemic area is relatively high, often 90 per cent, and in some instances all children exposed throughout the period of calcification of the teeth are affected. In the light of present knowledge, mottled enamel is a water-borne disease associated with the ingestion of toxic amounts of fluoride present in the water used for drinking and cooking during the period of tooth calcification. The minimal threshold has not yet been definitely established but studies to date would suggest that amounts below 1 p.p.m., expressed in terms of fluorine (F), are of no public health significance.

There is apparently no race, color, or sex differential. With respect to the teeth, the causative factor is operative only during the period of calcification, which, with the exception of the third molar represents approximately the first decade of life. There is some indication[4] that the skeletal system might likewise be affected; if this is true, it would be necessary to extend the time range to include adults.

The macroscopic pathology in the human has been classified according to severity thus: normal, questionable, very mild, mild, moderate, moderately severe, and severe. These various gradations have previously been described.[5] This classification, depending on the degree of severity of the affection, permitted in turn the development of the following "mottled enamel indexes" of a community[6, 7]: negative, border-line, slight, medium, rather marked, marked, and very marked. Several detailed studies[8, 9, 10] concerning the histopathology of this disease have been reported. An analogous hypoplasia developed under natural conditions has been observed in certain domestic animals.[11, 12] The sole hope in the solution of this problem lies in prevention. Since the ameloblasts cease functioning at the time of eruption of a tooth, such

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ameliorative treatment as is possible is naturally very limited in scope and generally unsuccessful. Bierring[13] in referring to this disease recently has recorded that "although different in nature from typhoid fever, [it] represents a permanent physical defect of distressing character."

Mottled enamel has direct relationships to other forms of oral pathology, some of these relationships being at times paradoxical. In spite of their defective structure, mottled enamel teeth, according to McKay,[14] exhibit no greater liability to caries than do normally calcified teeth, an inference apparently sustained by the investigations of Masaki,[15] Ainsworth,[9] and Erausquin.[16] Masaki[15] and Ainsworth,[9] in addition, maintain that the eruption of the secondary dentition is delayed.

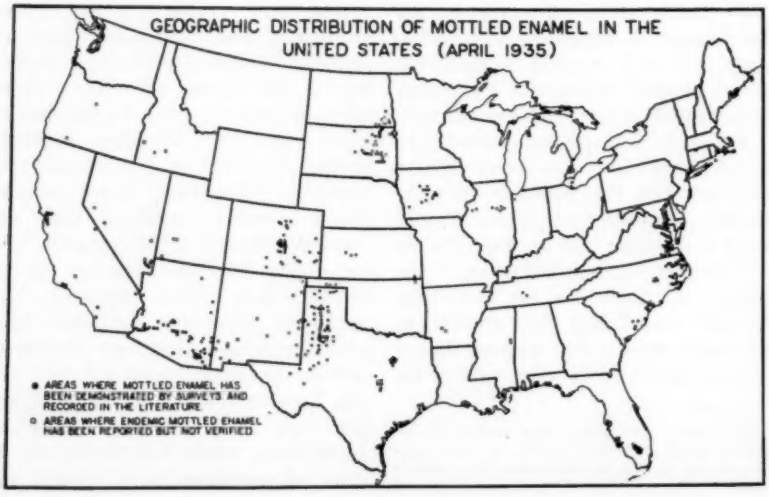
From observations made by one of us (HTD) in areas of relatively high fluoride concentration (more than 4.0 p.p.m.) there is, likewise, sufficient evidence to suggest an apparent tendency to a higher incidence of gingivitis (Figure I).

POSSIBILITY OF ERROR IN NON-QUANTITATIVE STUDIES

A review of the literature indicates that surveys of the past have been largely non-quantitative. In many instances data of little value are submitted relative to two important conditions, namely, (a) the number of children in the group studied, together with the length of time of their constant exposure, and, (b) possible changes in the chemical composition of the water used during the life period of the group examined.

The number in the group examined should consist of at least 25 children 9 years of age or older who had used the water under investigation continuously since birth for both drinking and cooking. Breaks in continuity totaling less than 30 days in any one calendar year are excepted. In instances where the examination of the first 25 children discloses an incidence of less than 75 per cent, the number in the group examined should be increased to at least 50, if possible. In other words, when more than 25 per

FIGURE I


GEOGRAPHIC DISTRIBUTION OF MOTTLED ENAMEL IN THE UNITED STATES (APRIL 1935)
● AREAS WHERE MOTTLED ENAMEL HAS BEEN DEMONSTRATED BY SURVEYS AND RECORDED IN THE LITERATURE
○ AREAS WHERE ENDEMIC MOTTLED ENAMEL HAS BEEN REPORTED BUT NOT VERIFIED

cent are diagnosed as "normal" or "questionable," the size of the group examined should be increased to compensate for fluctuations in sampling and their possible effect on the computation of the community mottled enamel index.

Studies of the past have, in most cases, failed to take into consideration what has recently been revealed by carefully conducted surveys which included the individual water histories of each child re-checked by an interview with the child's parent. These surveys [7] have shown, at least with respect to the 9 year old group in the 4 cities studied, that only about 20 per cent used the city water continuously from birth.

The need for an adequate clinical sample is obvious when we consider that the causative factor of mottled enamel is probably operative during the entire period of calcification of the permanent teeth; and an observed effect may be the result of a comparatively low fluoride concentration operating during the entire period, or a relatively high concentration for a shorter period. In endemic areas where the domestic water contains a fluoride concentration only slightly above the minimal threshold, the production of visible signs of mottled enamel in the susceptibles of the group examined would probably depend upon the continuous use of the water during the entire period of calcification. On the other hand, in areas where the domestic water contains a comparatively high fluoride concentration, its use during a part of the period of calcification is sufficient to produce observable mottled enamel. A careful analysis of the data from the Bauxite survey [17] makes this latter point apparent.

Because of possible changes in the fluoride content of water supplies, it is obvious that an attempt to correlate clinical observations with a single fluoride determination of a municipal water associated with endemic mottled enamel introduces the possibility of questionable correlation. In respect to water from deep wells, the fact that the mineral content usually varies within comparatively narrow limits might be misleading until it has been definitely ascertained that there have been no changes in the physical set-up of the water supply during the lifetime of the children. Hence the amount of fluoride in a water sample taken at the time of the clinical examination may mean little unless a complete history of the water supply concomitant with the life of the children examined, has been obtained.

It must also be borne in mind that some municipalities using deep wells for their common water supply have more than one source of deep well water. For instance, the largest city in the United States known to be affected with mottled enamel regularly uses water from one group of wells for 6 months of the year, and from an entirely different group for the other 6 months. This rotation has been followed for the past 4 years, and since one supply has about twice as much fluoride as the other, it is evident that a single sample representing only one of these supplies would be valueless in correlating chemical findings with clinical observations. Moreover, the addition of new wells, or the abandonment of old ones during the lifetime of the group examined may introduce variable factors that would make it impossible to draw reliable conclusions from the chemical findings disclosed at the time of the examination. Furthermore, in dealing with surface waters or shallow wells, the seasonal and annual rainfall or other meteorological conditions become factors of importance. In this study, therefore, consecutive monthly water samples were obtained for 1 year and a fluoride determination was made on each sample.

TABLE I

FLUORIDE (F) CONTENT OF MONTHLY SAMPLES

(PARTS PER MILLION)

Month and Year	*Lubbock Texas*	*Amarillo Texas*	*Conway South Carolina*	*Plainview Texas*	*Mullins South Carolina*	*Big Spring Texas*
November, 1933		2.4	4.0		0.9	
December		2.5	3.9		0.9	
January, 1934	4.3	2.5	4.0	2.7	0.9	0.3
February	4.3	2.5	4.1	3.0	1.0	0.3
March	4.0	2.4	4.1	2.8	0.9	0.3
April	4.3	5.0	4.1	2.9	0.9	0.3
May	4.3	5.3	4.0	2.8	1.0	0.7
June	4.4	5.3	4.1	2.9	0.9	0.9
July	4.5	5.6	4.0	3.0	0.8	0.9
August	4.4	5.6	3.9	2.8	0.8	1.0
September	4.7	2.7*	4.1	2.9	0.9	1.1
October	4.4	5.0*	4.1	2.9	1.0	1.0
November	4.2			2.9		1.1
December	4.5			2.8		1.0
Mean annual fluoride content	4.36	3.9	4.03	2.87	0.9	0.7

* The Amarillo municipal water is obtained from two sources: October to March, inclusive, each year from the McDonald wells. April to September, inclusive, each year from the Palo Duro. In September, 1934, the city water was obtained from the McDonald supply on account of a break-down in the lines of the Palo Duro supply. In October, 1934, the water used in the city was from the Palo Duro; in November, the supply was again obtained from the McDonald wells.

PRESENT STUDY

This paper presents a comparison of the results obtained in the investigation of the following 10 cities: Monmouth and Galesburg, Ill.; Colorado Springs and Pueblo, Colo.; Lubbock, Amarillo, Plainview, and Big Spring, Tex.; and Conway and Mullins, S. C.

The detailed results, including chemical analyses, noted in the study of the Illinois and Colorado areas have been reported.[7] An approximate mottled

TABLE II

ANALYSES OF THE WATERS * USED

(PARTS PER MILLION)

	Lubbock Texas	*Amarillo Texas*	*Conway South Carolina*	*Plainview Texas*	*Mullins South Carolina*	*Big Spring Texas*
Residue on evaporation	882.0	468.0	633.1	390.0	172.0	314.0
Loss on ignition	77.0	73.7	16.6	37.0	18.2	27.0
Fixed residue	805.0	394.3	616.5	353.0	153.8	287.0
Silica (SiO_2)	64.0	51.8	17.0	62.0	43.0	19.0
Iron (Fe)	0.1	0.08	0.06	0.1	0.08	0.03
Aluminum (Al)	0.2	0.3	0.06	0.3	0.25	0.50
Calcium (Ca)	60.7	43.9	2.3	48.5	1.3	73.2
Magnesium (Mg)	72.6	47.8	0.5	35.8	0.8	6.6
Sodium and Potassium (calculated as Na)	131.4	54.1	255.1	41.9	49.3	31.1
Carbonate (CO_3)			36.0			
Bicarbonate (HCO_3)	342.8	389.2	256.0	331.8	124.2	226.9
Sulphate (SO_4)	255.0	52.0	3.4	32.5	4.3	31.9
Nitrate (NO_3)	1.0	4.4	1.0	2.2	0	4.0
Chloride (Cl)	111.8	13.5	49.5	31.8	7.9	34.0
Fluoride (F)	4.2	5.6	4.1	2.9	1.0	1.1
Phosphate (PO_4)	0	0	0	0	7.1	0
Boron (B)	0.5	0	2.5	0	0	0

* These samples of water from Lubbock, Plainview, and Big Spring were received in November, 1934; the sample from Amarillo, in August, 1934; and those from Conway and Mullins, in October, 1934. Assistant Chemist C. G. Remsburg carried out the determinations other than fluoride and boron, using mostly the methods given in the *Standard Methods of Water Analysis* of the American Public Health Association. The boron determinations were made essentially by the method of Foote.[19]

enamel index of each of the 4 Texas cities has already been reported,[6] but the chemical data are included in the present paper. Furthermore, there are included in this report, for comparative purposes, chemical findings of and certain relevant clinical observations from a recently made study in South Carolina.

The fluoride content of the monthly samples of water was estimated colorimetrically by means of the zirconium-alizarin reagent.[18] The results obtained are given in Table I.

As has been pointed out previously,[7] it may be reasonable to suppose that the mottled enamel index will be found to depend entirely on the fluoride concentration of the drinking water; but it is possible, on the other hand, that other constituents of the water may have some influence on the activity of the fluoride. For this reason it appears desirable that a careful survey of a community for chronic endemic dental fluorosis should include also, for the present at least, a chemical analysis of the drinking water for constituents other than fluoride. Results of the chemical analyses of the waters from the South Carolina and Texas cities are given in Table II.

The water histories, especially with respect to variation, and other comparative data obtained in the study of the 10 cities referred to are given in Table III.

DISCUSSION

An analysis of the history of the common water supply respecting continuity clearly indicates the extreme caution necessary in attempting to correlate clinical observations including verified water biographies, with a single fluoride determination or even an annual arithmetical mean of the fluoride content when the communal water supply itself contains one or more extrinsic variables. In more than half of the cities in the group there are sufficient interruptions to warrant caution

FIG. II

SEVERITY OF MOTTLED ENAMEL IN CHILDREN OF TEN SELECTED CITIES AND THE MEAN ANNUAL FLUORIDE (F) CONTENT OF THE MUNICIPAL WATER SUPPLY 1933-34.

CITY	SIZE OF SAMPLE	MEAN ANNUAL FLUORIDE (F) CONTENT P.P.M.	PERCENTAGE DISTRIBUTION OF SAMPLE ACCORDING TO SEVERITY OF AFFECTION 0 10 20 30 40 50 60 70 80 90
LUBBOCK, TEXAS	176	4.4	
AMARILLO, TEXAS	168	3.9	
CONWAY, S.CAR.	59	4.0	
PLAINVIEW, TEXAS	78	2.9	
COLORADO SPR. COLORADO	79	2.5	
GALESBURG ILLINOIS	57	1.8	
MONMOUTH ILLINOIS	38	1.7	
MULLINS SOUTH CAROLINA	47	0.9	
BIG SPRINGS, TEX.	68	0.7	
PUEBLO, COL.	83	0.6	

MODERATE TO SEVERE · MILD · VERY MILD · QUESTIONABLE · NORMAL

TABLE III

WATER HISTORIES AND OTHER COMPARATIVE DATA OF THE CITIES STUDIED.*

City and State	Population (1930)	Description of Water Supply with Respect to Variation	Quantitative Evaluation		Clinical				Mottled enamel index of the community	Mean annual fluoride (F) content (1933–1934) (parts per million)
			Presence or absence of requisites	Classification	Age group or school grade examined	Number of children examined who stated they had used municipal water continuously	Number showing mottled enamel	Incidence		
Colorado Springs, Colo.	33,237	Surface supply; melted snow from Pike's Peak stored in 7 mountain reservoirs 9,300′ to 12,000′ in altitude. No changes in present supply during past 20 years.	Present	A	9 year old	79	53	67.0	slight	2.5
Monmouth, Ill.	8,666	Since 1925 from two 2,445′ wells drilled to the "Potsdam" stratum of the Cambrian sandstone. Upper water-bearing strata cased off.	Present	A	9 year old	38	16	42.1	slight	1.7
Mullins, S. C.	3,158	Municipal water supply obtained from 2 deep wells, 350′ and 360′ deep and drilled in 1913 and 1921, respectively.	Present	A	9, 10, 11 years old	47	5	10.6	negative-border line	0.9
Pueblo, Colo.	50,096	Surface supply; Arkansas River. Samples taken from North Pueblo supply; clinical examinations likewise limited to children in northern half of city. North Pueblo supply from same source during past 46 years.	Present	A	9 year old	83	2	2.4	negative	0.6
Lubbock, Tex.	20,520	Municipal supply obtained from 8 wells, #1 (1925), #2 (1917), #3 and #4 (1924), #5 (1928), #6 (1930), #7 (1931), and #8 (1934). City water in general is a composite of these various wells distributed from 5 reservoirs in which water from specific wells is impounded. No. 4 well furnishes about 25% of the supply; Nos. 1, 2, 5, and 6 about 15% each, and Nos. 3, 7, and 8 about 5% each. Depth ranges from 140′ to 150′; all wells have perforated casings through each water bearing stratum. About half of the time only 2 pumps are operated and one section of the city may be served by one or two wells and another section by another well or group of wells.	Absent	B	4th 5th 6th grades	176	174	98.8	marked	4.4
Amarillo, Tex.	43,132	Prior 1927 from 35 wells, 250′ deep, located in various parts of city. In 1927 Palo Duro supply, 20 mi. SW of city consisting of 10 wells, 180′ deep, installed, and used exclusively until 1931 when McDonald supply consisting of 5 280′ wells, 7 mi. SW of city was installed. Since 1931 municipal supply from two sources: Oct.-March inclusive each year from McDonald wells; April-Sept. inclusive each year from the Palo Duro.	Absent	B	4th 5th 6th grades	168	162	96.4	rather marked	3.9

* Clinical examinations at Monmouth and Galesburg, Ill., were made during October, 1934; those of the 4 Texas cities during November, 1934, Colorado Springs and Pueblo, Colo., during April, 1935, and Mullins and Conway, S. C., during September, 1935.

TABLE III—Continued

WATER HISTORIES AND OTHER COMPARATIVE DATA OF THE CITIES STUDIED.*

City and State	Population (1930)	Description of Water Supply with Respect to Variation	Quantitative Evaluation		Clinical				Mottled enamel index of the community	Mean annual fluoride (F) content (1933–1934) (parts per million)
			Presence or absence of requisites	Classification	Age group or school grade examined	Number of children examined who stated they had used municipal water continuously	Number showing mottled enamel	Incidence		
Conway, S. C.	3,011	Municipal water supply is obtained from 3 artesian wells, a 3½" well drilled in 1896, 450′ deep; a 10" well drilled in 1918, 400′ deep, and a 3" well drilled in 1927, 305′ deep. All wells cased entire depth. Casings of the 400′ and 450′ wells have "slots" at the higher water bearing levels and water from these 2 wells represents a composite of more than one water bearing stratum. About 85% of the city water is obtained from the 10" well; the remainder from the 305′ well. Well drilled in 1896 supplies negligible amount. Analysis of a sample from each of the 3 wells shows slight variation in the fluoride (F) content; approximately 0.2 p.p.m.	Absent	B	9, 10, 11 years old	59	52	88.1	rather marked	4.0
Plainview, Tex.	8,834	Prior to 1926 from 2 wells, 93′ and 175′ deep (old supply); 1926–1928 from one well 275′ deep (new supply). From 1928 to date supply is a composite one, 75% from "new" supply and 25% from "old" supply. All wells within city limits are "gravel backed" thus permitting water from different strata to mix.	Absent	B	5th 6th 7th 8th grades	78 †	76 †	97.4	rather marked	2.9
Galesburg, Ill.	28,830	Since 1928 from 2 2,414′ wells drilled to the "Potsdam" stratum of the Cambrian sandstone. During 1924–1928, 60% of municipal supply from first 2,414′ well and 40% from 2 wells in St. Peters sandstone, 1,245′ and 1,252′ deep.	Absent	B	9 year old	57	20	35.1	slight	1.8
Big Spring, Tex.	13,735	Municipal supply obtained from 23 wells. One-third of supply from 13 wells, 260′ deep drilled in 1923. Two-thirds of supply from 8 wells, 280–300′ deep, drilled in 1927. During 1894–1923 all municipal water from "Old Park" supply, which was supplemented until 1927 by 1923 group of wells. During 1927–1933, "Old Park" supply shut down. Between Nov., 1933, and May, 1934, 1927 group of wells also shut down. Wells located 2, 6, and 9 miles, respectively, south of Big Spring.	Absent	B	5th 6th grades	68	2	2.9	negative	0.7

* Clinical examinations at Monmouth and Galesburg, Ill., were made during October, 1934; those of the 4 Texas cities during November, 1934, Colorado Springs and Pueblo, Colo., during April, 1935, and Mullins and Conway, S. C., during September, 1935.

† Large part of 1934 sample calcified their teeth while using "old" water supply, the "F" content of which is unknown. Recent survey (March, 1936) shows incidence of 87.6 and index of "medium."

in attempting to correlate clinical observations with the composition of the water at the time of the clinical survey.

The application of epidemiological principles for the purpose of determining a minimal threshold of toxicity produced under natural conditions presupposes that inferences shall not be drawn from studies of cities in which there is an interfering relevant variable in one or both of the factors which are to be correlated. The magnitude of the population of these 10 cities makes possible a clinical examination of a sufficiently large sample in each community having the essential characteristic of continuously using a common water supply for domestic purposes. But when an attempt is made to correlate the mottled enamel index of the community with the mean annual fluoride content, only 4 of the cities are appropriate for quantitative evaluation; in the others, an approximate evaluation only is possible.

With respect to an adequate clinical sample, it has been found desirable, if not necessary, in instances where the examination of the first 25 children discloses an incidence of less than 75 per cent, to increase the minimal number of the group, whenever possible, to at least 50. In other words, when more than 25 per cent are diagnosed "normal" or "questionable," the increase in the number examined naturally tends to compensate for the fluctuation in sampling and its corresponding influence on the computation of the community mottled enamel index.

The data obtained in the study of these 10 cities and the fact that many reports in the literature generally omit inherent basic data required for epidemiological purposes suggest the classification of endemic areas under three heads:

Class A—Communities where the requisites for a quantitative evaluation are present and have been analyzed

Class B—Communities where changes in the source of water supply and/or population preclude quantitative evaluation. In some instances, however, a careful analysis of the variable factor or factors may suggest an approximate evaluation

Class C—Communities which have been reported in the literature as affected with chronic endemic dental fluorosis (mottled enamel) but where the requisites for a quantitative evaluation were not stated.

In this study, Colorado Springs, Colo.; Monmouth, Ill.; Mullins, S. C., and Pueblo, Colo., are illustrative of Class A. Lubbock and Amarillo, Tex.; Conway, S. C.; Plainview, Tex.; Galesburg, Ill., and Big Spring, Tex., would come under Class B. A high percentage of endemic areas previously reported in the literature would be classified under C.

SUMMARY

1. The requisites for a quantitative evaluation of an area showing chronic endemic dental fluorosis (mottled enamel) are: (a) a common water supply whose history discloses no relevant changes in either its physical set-up or its source during the period concomitant with the life of the group examined; and (b) clinical examinations, the observations recorded quantitatively, of a minimum of 25 children, 9 years of age or over, who have used a common water supply continuously since birth for both drinking and cooking. Breaks in continuity totaling less than 30 days in any one calendar year are excepted. Moreover, in instances where the examination of the first 25 children discloses an incidence of less than 75 per cent, an attempt should be made to increase the number of children to 50 or more in order to compensate for fluctuation in sampling.

2. For the purpose of quantitative study, affected communities are classified on the basis of the presence or absence of the requisites for quantitative evaluation, as follows: Class A in-

cludes communities where the requisites for a quantitative evaluation are present and have been analyzed; Class B includes those where changes in source of water supplies and/or population make impossible the determination of a quantitative evaluation; and Class C includes communities which have been reported as affected with mottled enamel without stating whether the requisites for a quantitative evaluation are present or absent.

3. The percentage distribution of severity permits the computation of an actual or approximate "mottled enamel index" of an affected area. This index in turn may be correlated with the fluoride content of the water supply, expressed as an arithmetical mean of 12 consecutive monthly determinations.

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Whooping Cough in Surveyed Communities*

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As it is chiefly in the light of a definitely ascertained incidence that the relative importance of various modes of spread may be determined and the effectiveness of various control measures gauged, the basic question in the epidemiology of any disease is the determination of its incidence. In the case of the acute communicable diseases of childhood, a number of factors have directed attention away from incidence determinations. Among such factors could be mentioned the variable prevalence over short periods of time, the general reliance upon mortality to the exclusion of morbidity data, the inadequacy of the information furnished in many of the diseases by notification, and the cost of obtaining complete reports.

The present data are the results of field work in several communities in the United States under the auspices of the U. S. Public Health Service in collaboration with the Milbank Memorial Fund. The method is essentially that of a periodic canvass of a representative sample of white families in a stated area and the recording of pertinent data on interval illnesses—in the present instance, on attacks of whooping cough. Where a physician had seen the case, his diagnosis was obtained. At the start of each survey, the date of birth, sex, and previous history of whooping cough were recorded for each person; and similar data, together with the date of entrance, are recorded for each new arrival in the population under observation. All departures through change of residence and also deaths are recorded so that the number of persons under observation is known.

Two general types of survey are included in the present report. The first, which will be styled "local survey," was performed by essentially the same well trained field staff in 3 different localities—Cattaraugus County, N. Y., Hagerstown, Md., and Syracuse, N. Y. It will be noted that these represent 3 widely differing types of community. Cattaraugus is predominantly rural, with a very small village population, Hagerstown is a small city of some 30,000 persons, and Syracuse a relatively large one of approximately 200,000 inhabitants.

The second or "general survey" was the study conducted by the research staff of the Committee on the Costs of Medical Care, from which the whooping cough data have been made available through the kindness of Selwyn D. Collins, of the U. S. Public Health

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

† Deceased.

TABLE I

DATE, DURATION, AND NUMBER OF PERSONS OBSERVED FOR SPECIFIED SURVEYS

Community	Date of Survey	Duration of Survey in Months	Average Number of Persons Observed
Local Surveys			
Cattaraugus County Rural Area, N. Y.	1929–1932	36	4,940
Hagerstown, Md.	1922, 1923	28	7,079
Syracuse, N. Y.	1930, 1931	18	4,962
General Survey, Costs of Medical Care			
Rural	1928–1931	12 *	7,825
Towns and Villages less than 5,000	" "	"	8,964
Towns and Cities 5,000–100,000	" "	"	10,942
Cities Over 100,000	" "	"	15,240

* Although the period of observation of any one community was only 12 months, the field work in the several communities included in each category was spread over a period of 40 months.

Service, with which the committee's morbidity records were deposited for further analysis. This was a large survey performed in 18 states in various types of community and including some 9,000 white families. Unlike the local studies, the field staff for this survey was not previously trained in morbidity surveys, and varied in each of the many localities in which the work was performed. These factors gave rise to some uncertainty when the question of using the Costs of Medical Care data was considered, but it will be seen that the general survey rather strikingly confirms the local surveys, and that its figures have a more truly average value by virtue of the distribution of the field work in numerous areas, and over a period of years.

The local survey populations were much more representative of the population of the communities in which the studies were made, as the general survey of the Committee on the Costs of Medical Care included primarily families of 2 or more persons. The special characteristics of the latter populations and methods of collecting data have been outlined by Collins.[1] The essential point is, however, that both types of survey include fairly large populations accurately determined, and that the cases of whooping cough occurring in them during more or less prolonged periods of observation have likewise been quite accurately recorded. The size of the populations studied, the date, and the duration are given for each survey in Table I.

This report will make use only of the information obtained from these studies on: (1) case fatality, (2) histories of attack, and (3) attacks of whooping cough during the period of observation. The data obtained in the 3 categories will be compared and certain deductions as to the incidence of whooping cough will be made.

CASE FATALITY

In Table II have been assembled the cases and deaths recorded for the surveys embraced in this report. It will

TABLE II

CASES, DEATHS, AND CASE FATALITY FOR SPECIFIED SURVEYS

	Cases	Deaths	Case Fatality Per Cent
Cattaraugus 1929–1932	280	None	....
Hagerstown (Survey) 1922, 1923	374	None	....
" (whole city) 1922, 1923	(1,538)	(3)	0.20
Syracuse 1930–1931	93	None	....
Costs of Medical Care 1929–1933	841	3	0.36
All Surveys	1,588	3	0.19

be noted that no deaths were observed in the 3 local surveys, Cattaraugus, Hagerstown, and Syracuse, although 3 whooping cough deaths, all in persons not included in the survey, were registered for Hagerstown during this period. When the rates for whooping cough in the sample population were applied to the total white population of this small city, a total of 1,538 cases was obtained, the case fatality being 0.20 per cent. The case fatality of 0.36 per cent for the Costs of Medical Care survey was somewhat higher. It is seen to be based, likewise, upon a very small number of deaths, so that chance variations in the latter could affect it markedly. However, there is a certain amount of evidence which would indicate that the observed rate is typical. At Dr. Collins's suggestion, the mean age-specific whooping cough mortality rates for white persons in the registration area in 1930–1931 were applied to the person-years of observation of the Costs of Medical Care Study, and the figure of 3.2 deaths so obtained tallies closely with the observed number.

The figures for whooping cough case fatality based upon notified cases and registered deaths commonly show a considerably higher rate even when the factor of incompleteness of reporting is controlled. This raises the question of whether there may not be a fairly high proportion of cases of chronic bronchitis included in the survey series of cases. As only about 50 to 70 per cent of the cases were attended by physicians, it was not always possible to obtain a medical confirmation of the diagnosis. The lay criterion for whooping cough is based chiefly upon the crowing inspiration which follows the attacks. It is therefore felt that the majority of these non-attended cases were actually overt whooping cough and that, if anything, they represent an under- rather than an overstatement.

Confirming these low survey figures, several indirect measurements of case fatality are to be found in the literature. Henderson [2] obtained the figure 0.2 per cent for London, Ontario, from data based upon histories of attack among children under 20 years of age, and Sydenstricker and Collins,[3] from histories of illness and of death in Cattaraugus, obtained an estimate of 0.33 per cent. Using somewhat the same method as Henderson, Collins [4] estimated the case fatality in children under 15 years of age at 0.54 per cent for the United States as a whole.

In the 5 year period 1929–1933, there occurred among white persons in the United States Registration Area an average of 4,500 deaths yearly from whooping cough. This probably represents a minimum, as it is generally felt that an undetermined number of deaths from whooping cough each year is listed under pneumonia. If whooping cough were a disease with a high case fatality, this would not imply a very great prevalence, but the case fatality is evidently not high. If the figure obtained from the Costs of Medical Care study, which is intermediate in relation to these various estimates, be taken as fairly reliable, the average of 4,500 deaths in the registration area represents 1,250,000 cases annually among white persons in that area. This method of estimating the number of cases has numerous limitations, but it at least shows in a general way the extremely high prevalence of the disease.

INCIDENCE

In obtaining incidence rates for whooping cough and many other illnesses, 3 general sources of data may be used: (1) reported cases, (2) recorded histories of attack, (3) recorded cases by morbidity survey.

That useful information may be obtained from analysis of reported cases

has been shown by Godfrey.[5] However, the fact that only about half of all cases are seen by physicians, and that but a small proportion of those so seen are reported, makes the data in this country seem of doubtful value when general incidence figures are to be obtained. In Scotland, Laing and Hay[6] and in England, Stocks[7] have published valuable studies of general incidence in cities, but the question still remains of how fully notification is achieved or, in the case of Stocks's work, of how completely it has been possible to allow for unreported cases.

It would appear that recording the percentages of individuals with a remembered history of prior attack of whooping cough, as has been done in this country by Henderson, Collins, Lombard, Scamman, Doering, and others, offers extremely useful data on prevalence. It is open to the objections that the incidence may have changed in recent years and that the memories of persons giving the histories may be fallible, but on the whole the data so obtained reflect surprisingly accurately the prevalence within the period covered and the method of collection is relatively inexpensive.

The data obtained by morbidity survey are perhaps the most complete if the survey is extensive enough and if it covers a sufficiently long time so that epidemic influences are controlled. When, as in the case of the surveys here reported, history data are combined with observations on current attacks, it is believed that a very definite picture of the incidence may be secured. The incidence measured in both cases is only that of overt attacks of whooping cough.*

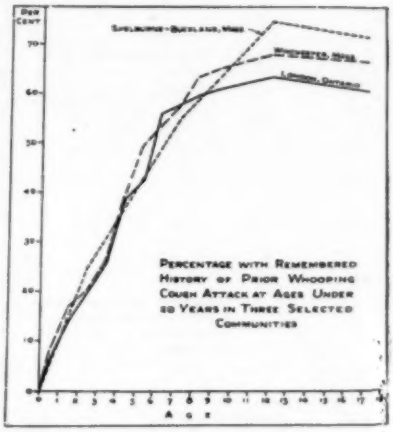

FIGURE I

It is proposed first to outline briefly the information obtained by recording the per cent at each age with remembered history of attack prior to the beginning of the surveys. In Figure I are shown curves giving these percentages for 3 communities recorded in the literature: Shelburne-Buckland, Mass., reported by Lombard and Scamman,[8] Winchester, Mass., reported by Scamman and Doering,[9] and London, Ontario, reported by Henderson.[2] Shelburne-Buckland represents a rural township population, Winchester a town of some 11,000 persons, and London, Ontario, a city of about 40,000 population. They are all on the same parallel of north latitude, a point which may be important, as there is some evidence that southern communities in this country show higher percentages with history of previous attack. The curves have been plotted only to 20 years of age, as histories are unreliable at older ages.

It will be noted that the more rural Shelburne-Buckland curve reaches a higher level, although it climbs somewhat more slowly. The level is about 75 per cent. The Winchester curve falls between the former and the Lon-

* There is a good deal of evidence that overt attacks are only one factor in immunization against whooping cough. Stocks (*loc. cit.*) has postulated a transient immunity in individuals exposed but not overtly attacked, and one other possible factor of a more permanent nature.

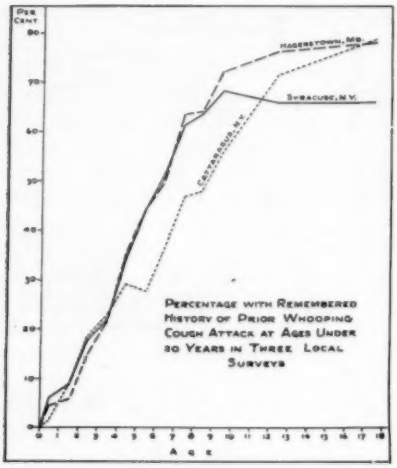
PER CENT
HAGERSTOWN, MD.
SYRACUSE, N.Y.
CATTARAUGUS, N.Y.
PERCENTAGE WITH REMEMBERED HISTORY OF PRIOR WHOOPING COUGH ATTACK AT AGES UNDER 20 YEARS IN THREE LOCAL SURVEYS
AGE

FIGURE II

don, Ontario, curve, the last reaching a level at about 64 per cent.

Figure II shows this same phenomenon for the 3 local surveys of Cattaraugus, N. Y., Hagerstown, Md., and Syracuse, N. Y. Here there is a definite difference between the levels reached by the rural and the large city groups, but the Hagerstown curve, which theoretically should lie between, actually reaches essentially the same level as the rural curve. This may be due to the possibility, mentioned above, that more southerly placed communities tend to show larger percentages.

Figure III shows this same data for the communities of varying size in the Costs of Medical Care study.

It will be noted in general that the curve for rural areas tends to rise somewhat more slowly, and that at 18 years of age it may still be rising, whereas the corresponding urban curves reach a somewhat lower level at 13 years of age or less. Translated into terms of incidence, this means that the smaller communities tend to have a lower attack rate at the earlier ages, and a higher one in the later years, and that they show a higher general incidence at ages under 20 years. This translation in statistical terms can be made quite accurately from these very curves, as Henderson and Collins have shown. Thus an average annual incidence below a given age can be obtained by dividing the percentage with prior history at the given age by the number of years from birth to that age. The figure would be the per cent attacked annually, and this multiplied by 10 would be average annual attack rate per 1,000. A rate so obtained would be, in a sense, standardized for age. It will be noted, however, that some of the curves shown in Figures I–III do not approach an asymptote but actually decline after age 15. There is good reason for believing that this is not due to a lower prevalence of whooping cough 15 or 20 years before the survey, but is an artefact dependent upon the inability of some informants to remember attacks occurring many years before. In obtaining by the above method the average annual incidence rates under the age of 20, entitled "Rates from history record cumula-

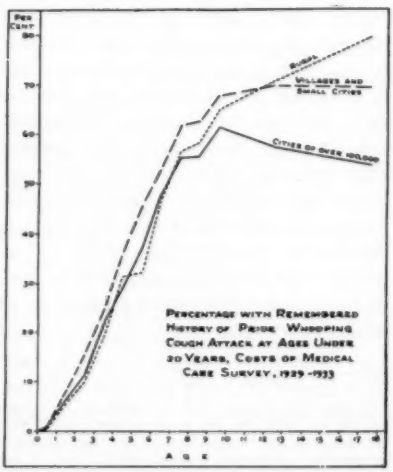
PER CENT
RURAL
VILLAGES AND SMALL CITIES
CITIES OF OVER 100,000
PERCENTAGE WITH REMEMBERED HISTORY OF PRIOR WHOOPING COUGH ATTACK AT AGES UNDER 20 YEARS, COSTS OF MEDICAL CARE SURVEY, 1929-1933
AGE

FIGURE III

TABLE III

ANNUAL WHOOPING COUGH RATES PER 1,000 OBSERVED IN SPECIFIED SURVEYS

	1. Local Surveys			2. General Survey, Costs of Medical Care				
	Cattaraugus	*Hagerstown*	*Syracuse*	*Rural*	*Villages and Towns Less Than 5,000*	*Towns and Cities 5,000–100,000*	*Cities 100,000+*	*All Communities*
Crude Rates All Ages	18.9	22.6	12.2	21.1	21.4	21.2	16.5	19.6
Crude Rates Under 20 Years	45.8	52.3	32.9	38.8	41.1	40.1	35.2	38.4
Standardized Rates * All Ages	18.1	18.9	12.9	15.0	13.9	13.2	11.4	13.1
Standardized Rates * Under 20 Years	43.8	48.0	32.8	36.7	34.9	32.5	29.2	32.8
Rates Under 20 Years from History Record Cumulation	40.5	40.0	33.7	37.5	35.7	35.0	31.5	34.5

* Standardization by age to white population of the United States, 1930 Census. Standardizing the general survey rates alters them more markedly than it changes the local survey rates, because the general survey populations were composed of families with 2 or more persons, and therefore contained relatively more children than the general population of the local surveys.

tion" in Table III, no decline in the curve is assumed to occur.

The second method of measuring incidence by the morbidity survey method is that of recording the attacks which actually occurred during the course of the survey. The current incidence in the 3 local surveys and in the Costs of Medical Care study by size of community, as well as the rates under 20 years of age, are shown in Table III. The crude rates are not entirely comparable owing to the varying proportions of individuals in the younger age groups, but it will be noted that the incidence in all but the very largest communities is surprisingly close to 20 per 1,000 for all ages and very close to 40 per 1,000 for ages under 20 years.

Based as they are upon person-years of observation, the figures in Table III are average annual rates and so may be considered as showing the expectancy for whooping cough in the respective communities. However, the local survey periods were relatively short, 36 months for Cattaraugus, 28 months for Hagerstown, and 18 months for Syracuse. It would appear that such periods are not very suitable for the calculation of expectancy because in Hagerstown 2 epidemic periods and only 1 inter-epidemic interval were included in the survey period, so that the rates are rather high. In Syracuse, the rates are possibly somewhat low. In the Costs of Medical Care survey, the period of observation in any given locality was only 1 year, but the distribution of the individual community surveys over a period of years and over a wide geographic range yields a much more nearly true mean rate. However, some care may be necessary in interpreting the crude rates of the general survey because only families of 2 or more were included and because some of the cases not having medical attention have apparently not been recorded. These two factors, one tending to raise the rates and the other to depress them, seem to some extent to have offset one another, for the crude rates of the general survey do not differ widely from those in the local studies.

It is evident that the inverse relationship between size of community and incidence, surmised in the discussion of cumulated history curves, does not appear in the crude rates except in the case of the largest com-

munities. It does, however, appear when the rates are standardized for age. The gradient is most characteristic in the standardized rates of the general survey, the incidence in the local surveys being somewhat irregular for reasons explained above.

The rates under 20 years of age obtained by the method outlined under the discussion on history of prior attack are also given in Table II. Although these are not directly comparable to the other types of rate, they do demonstrate the declining incidence with increasing size of community just as do the standardized rates.

The standardized rate of 13.1 per 1,000 for the Costs of Medical Care survey is the most suitable figure for calculating an expectancy for large areas of the United States. When this is applied to the average white population of the registration area in 1929 and 1930, a total of 1,357,000 cases is obtained. This is a somewhat more accurate figure than the expectancy calculated from the case fatality and deaths, but it should be remembered that it is still a minimal one.

AGE INCIDENCE

The whooping cough rates that were observed in each survey are presented in somewhat more detail as regards age in Table IV.

That whooping cough in common with many other infectious diseases of childhood has an older age incidence in rural than in urban areas has long been known. Because the incidence of whooping cough may have varied somewhat in the various communities, as explained above, the ratio of the rates at specified ages to the gross rates under 20 years of age for the respective surveys is used as the basis of the comparison portrayed graphically in Figure IV for the local surveys, and

TABLE IV

WHOOPING COUGH RATES AND CASES OBSERVED AT SPECIFIED AGES IN THE RESPECTIVE SURVEYS

	1. Local Surveys			*2. General Survey, Costs of Medical Care*				
Age Group	*Cattaraugus, N. Y.*	*Hagerstown, Md.*	*Syracuse, N. Y.*	*Rural* *	*Towns and Villages Less Than 5,000*	*Cities 5,000–100,000*	*Cities 100,000+*	*Total*
			Rate Per 1,000 Person-Years Observed					
All Ages	18.9	22.6	12.2	21.1	21.4	21.2	16.5	19.6
0–19	45.8	52.3	32.9	38.8	41.1	40.1	35.2	38.4
0– 4	70.9	117.6	67.9	76.1	83.8	78.3	77.0	78.6
5– 9	65.1	67.5	60.0	50.5	47.0	45.4	36.4	43.6
10–14	29.4	7.0	2.9	16.6	9.8	4.8	4.7	8.4
15–19	9.3	1.4	0	3.9	0	2.4	0	1.5
20+	2.2	0.9	0.6	1.6	0.9	1.3	0.4	0.9
			Number of Cases Observed †					
All Ages	280	373	91	165	192	232	250	840
0–19	260	365	88	159	188	225	247	821
0– 4	102	209	41	78	109	138	162	487
5– 9	104	142	45	59	68	79	79	285
10–14	43	12	2	19	11	6	8	44
15–19	11	2	0	3	0	2	0	5
20+	20	8	3	6	4	7	3	20

* Rural: Does not include incorporated villages, however small.

† The case totals of the general survey include a small proportion of cases in persons who were observed less than the full 12 months, but more than 7 months. As the "part-time" population was also used in obtaining the rates, the latter are not materially affected, but these case totals will not agree with those of studies based upon the "full-time" population only.

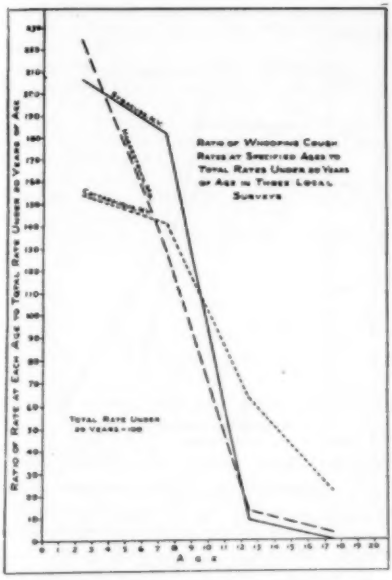
RATIO OF WHOOPING COUGH RATES AT SPECIFIED AGES TO TOTAL RATES UNDER 20 YEARS OF AGE IN THREE LOCAL SURVEYS
TOTAL RATE UNDER 20 YEARS = 100
RATIO OF RATE AT EACH AGE TO TOTAL RATE UNDER 20 YEARS OF AGE
AGE

FIGURE IV

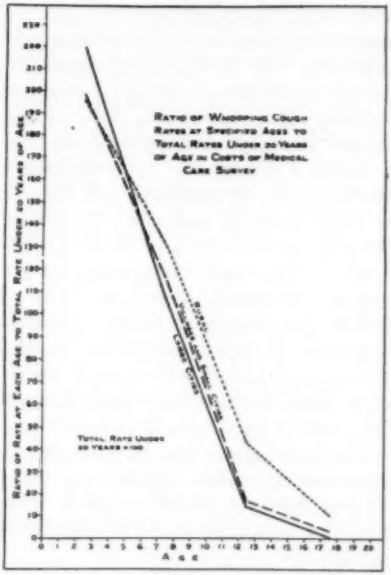
RATIO OF WHOOPING COUGH RATES AT SPECIFIED AGES TO TOTAL RATES UNDER 20 YEARS OF AGE IN COSTS OF MEDICAL CARE SURVEY
TOTAL RATE UNDER 20 YEARS = 100
RATIO OF RATE AT EACH AGE TO TOTAL RATE UNDER 20 YEARS OF AGE
AGE

FIGURE V

in Figure V for the Costs of Medical Care study. Possibly the emphasis placed upon families in the general survey has tended to obscure the differences related to size of community, but it will be seen on the whole that the smaller communities tend to have lower rates at the younger ages and higher ones at later ages than do the larger communities.

These differences begin to appear even in small villages as contrasted with farm populations. This is shown in Figure VI, where the respective age-specific ratios of the Cattaraugus survey are compared.

SEX INCIDENCE

The official mortality registration data of many countries show a somewhat higher whooping cough mortality for females than for males at most of the ages of life. This excess mortality in females has long been recognized as a peculiarity of the disease and was at first considered to be due to anatomical differences between the sexes. Of late, however, the tendency has been to find an explanation, at least in part, on the

TABLE V

RATIO OF FEMALE TO MALE INCIDENCE AT SPECIFIED AGES

MALE INCIDENCE EQUALS 100

Local Surveys

Age	*Cattaraugus*	*Hagerstown*	*Syracuse*†
0– 4	122	92	90
5– 9	102	89	185
10–14	110	70	...
15–24	163	182	...
25+	163	118	...
All Ages	114	78	145

General Survey, Costs of Medical Care

	Communities of Less than 5,000	*Communities of More than 5,000*
0– 4	126	103
5– 9	82	97
10–14	137	248
15–24	94	85
25+	1,065*	160
All Ages	106	99

* Male rate computed from a single case

† Rates based upon a very limited number of cases

basis of a higher incidence of the disease among females.* To such an explanation the figures based upon reported cases give a certain amount of support, but data from the various surveys are not entirely confirmatory.

Table V shows the ratio of female to male rates at specified ages for the 3 local surveys and for the major divisions of the Costs of Medical Care study. The only differences which appear constantly here are: (1) a female preponderance in the youngest age-group in small centers of population as contrasted with a very nearly equal incidence or a male preponderance in cities; (2) a tendency to female preponderance after age 15 or 20, a phenomenon which appears in many of the infectious diseases and is probably due to forces other than increased susceptibility.

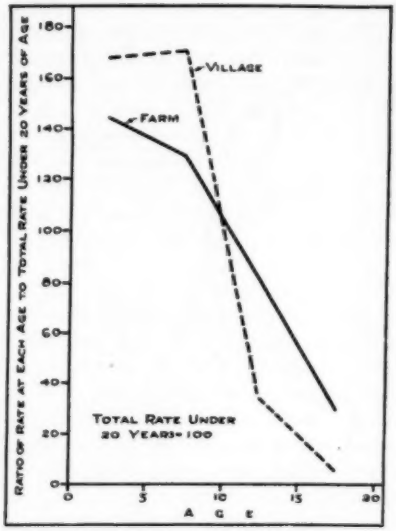

FIGURE VI—Ratio of whooping cough rates at specified ages to total rates under 20 years of age for village and farm populations, Cattaraugus, 1929–1932

SUMMARY

The report deals with the case fatality and incidence of whooping cough in various types of population and with technics of obtaining more reliable incidence figures by morbidity survey methods.

The case fatality of whooping cough was found to be extremely low in the surveyed populations, approximately 0.36 per cent.

Of the 3 sources of information on whooping cough prevalence—reporting, recording histories of prior attack, and recording observed attacks—the paper deals only with the last 2, because of the unreliability of reported totals.

The use of history data in the study of incidence is outlined, comparisons made with such data obtained in various localities, and the tentative conclusion reached that whooping cough incidence varied inversely with the size of the community. Further evidence was found for this in the whooping cough rates observed during the period of the respective surveys.

The age-specific rates under age 20 vary with the size of the community, the larger cities showing higher rates among young children and lower rates in older children than the village and farm populations do.

Finally, few outstanding and consistent differences were noted in the incidence of whooping cough among males and among females in the younger ages of life.

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For an Amended S. 5

SPEAKING for twelve organizations of women, Alice L. Edwards, Executive Secretary of the American Home Economics Association and chairman of a special legislative committee representing the organizations, endorses—with certain stipulations—the embattled S. 5 (the Copeland Bill) designed to regulate sales of food, drugs, and cosmetics.

Besides the Home Economics Association, the groups for which Miss Edwards speaks are: the American Association of University Women, the American Dietetic Association, the American Nurses' Association, the Girls' Friendly Society, the Medical Women's National Association, the National Board of the Y.W.C.A., the National Congress of Parents and Teachers, The National Council of Jewish Women, the National League of Women Voters, the National Women's Trade Union League, and the Women's Homeopathic Medical Fraternity.

We earnestly desire the passage of an amended S. 5.

We consider that it is essential that the seizure provision be changed to conform to the present practice. Of course, this change would include the deletion of the provision that makes it possible for the claimant to require that all trials in connection with seizures of his product be held in the court in the district where he resides.

The so-called variations clause should be so amended as to require that a drug product varying from the standard set forth in official compendiums be labeled to indicate in what way it varies.

We also consider it extremely important that the enforcement of the advertising provisions be left in the hands of the Food and Drug Administration, instead of being transferred to the Federal Trade Commission as is urged by certain drug and cosmetic manufacturers.

We consider it highly desirable that everything possible be done to bring about the enactment of a properly amended S. 5 during the present session of Congress.

We know that Congressmen are receiving many letters from their consumer constituents, urging the enactment of a suitable bill for the consumers' protection. We appreciate the fact that many commercial groups that formerly opposed this legislation now have withdrawn their opposition. We wish that more of them might become energetic supporters, aiding consumers in obtaining the enactment of a bill fair to producers, distributors, and consumers alike. We feel that enactment of such legislation would be of advantage, not alone to consumers, but to all reputable manufacturers and would, of course, set the stage for the renewal of consumer confidence in advertising.—

Printers' Ink, Apr. 9, 1936.

Dermatitis from Synthetic Resins and Waxes*

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DERMATITIS in the manufacture of natural resins and from their use has been reported by numerous observers,[1] but dermatitis in the manufacture of synthetic resins and from their use has not been frequently reported [2] or studied.

The principal synthetic resins manufactured in the United States are:

1. Phenol-formaldehyde resins, sold under various trade names, such as Bakelite, Durite, Durez, Resinox, Indur, etc.
2. Urea-formaldehyde resins, sold under trade names such as Beetle, Plaskon, Unite
3. Coumaron resin, made from coal tar residue
4. Ester gums, which are natural resins, such as Rosin, Dammar and Copal, in which the acid of the resin has been combined and neutralized with glycerol
5. The glyptal resins, which are a combination of glycerol and an organic acid, such as phthalic and malleic acids
6. The vinyl resins, which are vinyl esters, ethers or halides combined with phenol, formaldehyde and hexamethylenetetramine
7. Furfural resins, obtained from combining furfural with phenol (furfural obtained from corn cobs by treating with H_2SO_4 and fractional distillation)
8. Chlorinated resins, obtained by chlorinating various oils and balsams
9. Chlorinated waxes, obtained by chlorinating mineral oils, paraffin, naphthalene, di-phenyl, etc.

These resins are used for many purposes:

For making plastics, such as telephone receivers, pipe stems, push buttons, ear phones, cigar holders, bottle caps, buttons, inks, artificial teeth plates, ornaments, bracelets, earrings.

For making varnishes, flexible coatings, floor finishes.

For making cements, wall boards, gears, dishes, water containers, insulators, rubber compounds, and numerous other objects and for electrical insulations on condensers and wires.

The most important of the resins, from a standpoint of volume used and skin hazards, are the phenol-formaldehyde, the urea-formaldehyde and the coumaron resins.

PHENOL-FORMALDEHYDE RESINS

These are made in two principal varieties:

1. The cast resin, which is finished in the factory
2. The molding resin, which is sold to molding companies and completed in the molding process

Phenol or cresol, formaldehyde and ammonia are mixed in proper proportions in a kettle and heated a sufficient length of time and to the proper temperature.[3] They combine and are drawn out of the kettle in the form of a syrup. This is run into pans and allowed to cool, when it solidifies. This is known as "first stage resin," or "alpha resin." The pans are then heated, the resin re-melted and poured into suitable molds. These are placed in large, mineral oil filled carriers and

* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

placed into *curing* ovens, where they are heated and go through the so-called beta and gamma stages into the completed cast resin.

After being taken out of the oven, the resin is taken out of the molds and oil, and washed with soap and water and dried, and it is then ready to be carved or lathed or bored into whatever object is desired.

During the course of these operations, formaldehyde is given off and the air of the room is strong with the odor of it, unless adequate forced ventilation is employed. Workers in the rooms who are sensitive to formaldehyde may develop dermatitis of the face, neck, and arms, as well as of the covered parts where there is friction, such as the belt line, the ankle at the shoe top, and the wrist at the cuff line.

The oil used in the curing process dissolves out of the resin some of the phenol and formaldehyde and, if used over and over again, it can contain considerable quantities of these substances. One sample which was analyzed after it came out of the ovens contained 2 per cent each of phenol and formaldehyde. The men handling this oil have their clothes splashed with it and at times suffer not only from oil acne and dermatitis of the legs, thighs, and other parts touched by the oil-soaked clothing, but also from dermatitis due to the irritating action of the phenol and the formaldehyde contained in the oil. The eruption in these cases is usually a diffuse erythematous base on which there are scattered the papules and pustules of an oil folliculitis.

The girls washing the oil off the resin, with soap and water, may also develop dermatitis of the hands and arms from the oil and also from the strong soap solution with which their hands are constantly wet. In many factories, the oil is treated with sodium hydrate after each baking in order to neutralize the phenol and formaldehyde it may contain, but if this is not carefully done, dermatitis may result from too much alkali.

The skin hazards to the users of these cast resins are practically nil, because when they are finished no phenol or formaldehyde are given off from them.

The molding resin is made up in numerous qualities, containing different proportions of phenol and formaldehyde and ammonia. It is carried to the alpha stage or beta stage, and then is ground, heated, and mixed with ground wood, zinc stearate, soap, dyes, and hexamethylenetetramine in a mix mill. From this mill it is discharged on to conveyors, where it is air cooled. While cooling, it forms lumps which are ground in mills to proper sizes fit for molding. The workers engaged in mixing, grinding, and packing the molding resin are all exposed to the dust of the irritating chemicals it contains, as well as to the formaldehyde which it gives off, the odor of which permeates the rooms. Dermatitis is a frequent occurrence in this occupation, especially if the rooms are not properly ventilated to draw off dust, and if the machines and jobs where there is dust are not properly protected by suction hoods.

In a factory employing about 400 workers, where no great care was taken to allay and prevent dust, 27 cases of dermatitis occurred in 8 months. Patch tests performed on 10 cases with various resins, hexa, 4 per cent solution of formaldehyde, and 2 per cent solution of phenol, showed that hypersensitivity to hexamethylenetetramine and to formaldehyde was the cause of 80 per cent of the occupational dermatitis in this plant. Hypersensitivity to phenol was also found, but in lesser degree than to formaldehyde and hexa.

The actual cause of dermatitis from exposure to hexa and formaldehyde is the same. They both finally decompose in the presence of warmth and moisture

into formic acid, which is the real skin irritant.

Dermatitis from the dust of the molding resins usually occurs at the points of friction with the clothing—the wrist, the belt line, the shoe tops and the collar line. It may, however, occur on the covered parts when the dust penetrates the clothing. The skin around the eyelids may also be affected. The eruption consists, usually, of scattered papules and vesicles on an erythematous base.

It gets well if the worker stays away from work, and returns again if he resumes work. In this factory, the dermatitis was more prevalent in the winter because the workers did not take showers in cold weather after their shift, whereas in the summer they were more likely to do so.

UREA-FORMALDEHYDE RESINS

These are made by mixing urea and formaldehyde in a kettle. No heat is required, the reaction generating its own heat. A syrupy liquid results. This is mixed with bleached sulphite pulp, under heat and pressure, and dried in tray dryers. It is then mixed in a ball mill with pigments, zinc stearate, and a small amount of hexamethylenetetramine, about ½ per cent. It is then screened, and is ready for shipment. Minute amounts (fractions of 1 per cent) of other ingredients are added to different brands.

The manufacture of the urea-formaldehyde resins on a commercial scale is more recent than that of the phenol-formaldehyde resins, hence the two factories studied had more modern machinery and safety appliances than the phenol-formaldehyde resin factories. There were adequate ventilation facilities and good facilities for dust prevention. As a result, among 190 employees over a period of over 2 years, there had occurred only 4 cases of dermatitis. They were all due to hypersensitivity to formaldehyde. Two chemists in the experimental laboratory of these plants were hypersensitive to formaldehyde and suffered with dermatitis when exposed to it. One of them exposed his forearm in my presence to the mouth of an open bottle of formalin and almost immediately an erythema developed on the exposed skin.

In a molding plant in Ohio employing about 300 workers, where phenol-formaldehyde and urea-formaldehyde resins are used, 26 cases of dermatitis occurred in the first 10 months of 1934, and in a molding plant in Pennsylvania half of the workers developed dermatitis in the hot months of 1935.

The process of molding is practically the same for all the resins. The powder is placed in a "pill machine" and pressed into proper shapes for the molds. The pills are then placed into the molds where they are subjected to heat and pressure which shapes and hardens them. During the molding process gases are given off from the molds and the odor of formaldehyde is strong in the room and irritates the nose and throat and eyes of those unaccustomed to it.

There is an excess of powder in the molds which flows out during the molding process and is only partially "cured." This is called the "*flash*." When the molds are opened the flash is cleaned off the molds and filed off the molded object.

Patch tests with the resins with which they worked were performed in the winter on 2 active cases of dermatitis, and 10 workers who had recovered from dermatitis, gave only 2 positive reactions, 1 to the phenol-formaldehyde and 1 to the urea-formaldehyde resin. The examination and history of the 10 cases who had dermatitis but were free of it when the patch tests were made, showed that 2 had dermatophytosis and 1 probably had ptyriasis rosea. It

is probable that a considerable number of the 26 cases reported in 1934 were not of industrial origin.

The same plant was visited in August, 1935. Twelve cases of dermatitis had occurred since the first visit 9 months before. This time 9 workers who had dermatitis during this period were patched with suspected samples of urea-formaldehyde and phenol-formaldehyde resins, as well as with hexamethylenetetramine. Four showed no reactions after 24 hours to any of the 7 patches applied. Five showed positive reactions to one or more of the resins, and of these 5, 3 showed positive reactions to hexamethylenetetramine.

Two of the 4 cases who showed no reaction had eruptions at the time the patches were applied. One was a case of dermatophytosis and the other an eczema which dated back to childhood. The weather was cold (less than 70°) during the period the patches were on, and this may have a bearing on the reactions, because, of the 26 cases reported in 1934, 18 had occurred during periods of hot weather in May, June, July, and August.

There can be little doubt that a considerable percentage of the dermatitis in this plant was of occupational origin.

That hexamethylenetetramine is a major causative factor, is shown by the fact that most of the cases occurred in workers handling the phenol-formaldehyde resin, which contains more of it than does the urea-formaldehyde resin.

Hexa, which was extensively used in the rubber industry as an accelerator and caused dermatitis, has now been almost entirely displaced by other accelerators. It is necessary in certain phenol-formaldehyde molding resins in order to furnish the necessary amount of formaldehyde and ammonia required to go through the gamma stage—or to completion.

In the urea-formaldehyde resin, hexa acts as a stabilizer to prevent the resin from hardening before it is molded.

The ventilating and dust prevention conditions in the molding plants were poor. There were no suction hoods over the molding machines. The suction hood over the "pill machine" was out of order. There was only window ventilation in the workrooms, and wash-ups or showers after work were not compulsory. With proper dust allaying facilities, such as forced ventilation, suction hoods, wet sweeping of floors after each shift, compulsory showers, protective clothing and ointments, the incidence of dermatitis in this plant could be decreased.

Dermatitis may occur in users of molded phenol-formaldehyde and urea-formaldehyde resin wares if the hexa is not all combined. Theoretically, it is all combined in the completed resin, but practically (as in some imperfectly cured pieces or pieces in which there was too much hexa in the molding compound to be completely taken up), there may be a sufficient amount remaining to cause dermatitis in hypersensitive people. The same thing may be true of the phenol, if not completely combined.

Dermatitis has been reported as due to contact with finished resin products, such as dermatitis of the ear from telephone receivers, and of the hands from varnishes.

In order to show that a dermatitis may have been caused by contact with a resin, it must be established that:

1. The dermatitis followed contact with the resin
2. That portion of the skin which came in contact with the resin was first affected
3. A powdered portion of the suspected resin placed on the clear skin near the eruption in the form of a patch test, gives a positive reaction if left on 24–96 hours

To determine the actual chemical in the resin which caused the dermatitis,

the nature and chemical composition of the resin must be determined, and patch tests performed on the patient with each of the chemicals composing the resin in order to determine to which of them the patient is hypersensitive.

The patches of the chemicals should be in such dilutions as will not cause reaction on the normal skin if allowed to remain on for 24 hours.

A 2 per cent aqueous solution of phenol can remain on the normal skin in the form of a patch test, for 24 hours without causing a reaction.

A 4 per cent solution of formaldehyde can remain on the normal skin, in the form of a patch test, for 24 hours without causing a reaction.

Powdered hexamethylenetetramine may remain on the normal skin, in the form of a patch test, for 24 hours without causing a reaction.

Powdered coumaron resin may remain on the normal skin, in the form of a patch test, for 24 hours without causing a reaction.

Coumaron resin is used in varnishes, adhesives, rubber, paint, chewing gum, lacquers, paper and fabric sizing, printing inks, and waterproofing.

It is made from the crude coal tar distillate, which comes off between 150° and 200° C.

This distillate is re-distilled to remove impurities such as benzol, toluol, zylol, naphthalene and tar acids—and a sharply fractionated naphtha is obtained. The naphtha is dried in lead-lined or stone-ware receptacles by treatment with H_2SO_4, in the proportion of 3 to 5 parts per 1,000. After standing a while, the acid is drawn off and fresh H_2SO_4 is added slowly and agitated until 3 to 5 per cent of acid is added. The kettle is kept cold during the reaction with brine-cooled refrigeration.

After the reaction takes place, the mixture is allowed to stand until the tar and sludge settle. They are then removed and the remaining oil is pumped to a neutralizing tank and treated with caustic soda to destroy the remaining acid. The oil is then washed with water to remove the soluble matter, and it is allowed again to settle and the water is removed.

The oil is now distilled and the solvent naphtha is distilled off and the naphthalene is removed by live steam. After this, there remains a heavy oil boiling at 320°–330° C., which is removed from the resin.

COUMARON RESINS

There are no skin hazards, outside of acid and alkali burns, in these operations, because they are totally enclosed. No skin lesions were found in a large plant and the medical records for a number of years showed no cases of dermatitis.

Dermatitis has occurred from coumaron resin in varnish which was used on heddle frames in a cotton mill. The skin on the forearms of the weavers was struck continuously by the moving heddle frames and some developed dermatitis. Patch tests showed that they were sensitive to chlorinated ceresin and coumaron resin in the varnish. The varnish grades of coumaron resin, especially the darker resins, may contain sulphuric acids resulting from the sulphuric acid treatments, if they are not carefully prepared, and it is these acids that cause dermatitis.

SYNTHETIC WAXES

The principal synthetic waxes manufactured in this country are chloro naphthalenes and the chloro diphenyls. They are both used for practically the same purposes—as electric insulators on condensers, as insulators on electric wires, in paints, varnishes, and lacquers, and as oil in transformers.

The chlorinated naphthalenes are made by passing chlorine through

naphthalene and replacing of the hydrogen atoms with chlorine. One or more of the hydrogen atoms can be replaced, forming mono, di, tri, up to per chloro naphthalene, in which 8 of the hydrogen atoms are replaced with chlorine, the formula being $C_{10}Cl_8$. The more chlorine, the more solid is the material.

In making chlorinated diphenyls, it is first necessary to manufacture diphenyl, $C_{12}H_{10}$. This is manufactured by passing benzol, C_6H_6, through molten lead, at a temperature of about 800° F., where 2 molecules of benzol combine to form 1 molecule of diphenyl, hydrogen being set free.

Diphenyl is a solid, crystalline-like substance. This is melted in closed cylinders and chlorine is bubbled through, replacing the hydrogen. One or more of the hydrogen atoms can be replaced, forming mono chloro diphenyl, di chloro diphenyl, up to deca chloro diphenyl, $C_{12}Cl_{10}$. Hydrochloric acid is a by-product of this reaction. The chloro diphenyls are liquid or semi-solid, up to the hexa chloro diphenyl.

Nonochloro diphenyl, $C_{12}HCl_9$, sold under the trade name of Arachlor, is used as an insulator for automobile electric wires and in condensers, and also as a de-lusterer of rayon.

In the manufacture of the chloro diphenyls, the workers are exposed to a benzol hazard when the diphenyl is made, as well as to a hazard from the inhalation of the fumes of diphenyl.

The workers engaged in chlorinating the diphenyl, especially that part of the operation where the crude Arachlor is being re-distilled to remove impurities, are affected with an acne-like condition of the skin. This also occurs in workers exposed to the fumes of the chloro naphthalenes, or Halowax. The fumes of these compounds cause acne on the face and neck and may penetrate the clothes and cause acne-like lesions to develop on the covered parts, the shoulders, and the belt-line, and even on the penis. The lesions on the skin resemble acne. They begin as small, pale, elevated papules, many having no openings in them. They develop into hard cyst-like elevations under the skin, some of which go on to suppuration, forming boils. Some of the lesions also occur at the mouth of the follicles and resemble the comedones and pustules of acne vulgaris.

In addition to these skin lesions, symptoms of systemic poisoning have occurred among workers inhaling these fumes. Those working with the chloro diphenyls have complained of digestive disturbances, burning of the eyes, impotence and hematuria. The latter symptom developed among a number of men making amino diphenyl, which is used in the manufacture of a rubber antioxidant. Cases of death from yellow atrophy of the liver have been reported among workers exposed to the fumes of the chloro naphthalenes.

Patch tests performed with Halowax and with the chloro diphenyls have yielded negative results. The skin lesions probably result from the mechanical plugging up of the follicles of the skin with the waxes as the fumes solidify on the skin.* The chlorine present in the waxes may have an irritating effect on the plugged follicles and cause suppuration.

PREVENTION

1. The protection of the workers from the irritating chemicals that compose the resins and waxes from the resins and waxes themselves. To do this, the process should be totally enclosed. If this is not possible, hoods with suction exhaust should be so placed over open processes that dust and fumes are pulled away from the worker and out of the room.

*I have recently seen the wife and child of a worker who had developed comedones and pustules from contact with his work clothes which were saturated with halowax and which he was accustomed to wear at home. L. S.

2. The workrooms themselves should be ventilated by intake and exhaust fans to remove dust and fumes.

3. The floors, walls, and ceilings should be washed down at frequent intervals to keep them free of dust.

4. Two lockers should be furnished to each worker. One for his street clothes and one for his work clothes. The lockers for street clothes and work clothes should be in separate rooms, with the shower baths between the locker rooms. The worker coming to work enters the locker room for the street clothes, takes them off, and puts them in the locker and goes into the locker room where his clothes are kept and dons them. From this room he goes to the workrooms through a connecting door. At the end of his shift, he goes through this door to the work clothes locker room, takes off his work clothes and leaves them on the floor or bench to be washed and then goes to the shower baths and bathes and dries. Then he goes to the street clothes locker room, puts on his clothes and goes out of the door leading to the street. It has been estimated at one plant where such a system was instituted that 6 cents a day per worker will take care of furnishing clean work clothes each day.

5. New workers who are hypersensitive, but have only mild eruptions, should be given protective ointments and clothing and kept at work for about 3 or 4 weeks with the hope that they will develop an immunity or become "hardened." If this does not occur, they should be taken off the job.

6. New applicants for jobs should be carefully examined for skin diseases and those found to have them should not be employed.

7. There should be periodic medical examination of workers to detect cases of dermatitis and workers in chlorinated naphthalenes and diphenyls should be periodically examined for symptoms of systemic poisoning.

8. Laws should be passed making it compulsory for factories where there are skin hazards to adopt these measures.

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A.I.C.P. Guide for Public Health Nurses

A *GUIDE for Public Health Nurses* published by the New York City Association for Improving the Condition of the Poor, is a unique publication. A systematic description of cardiac conditions, for the benefit of public health nurses and a guide to the care which they can give patients has recently been prepared by the Bureau of Educational Nursing and has been subjected to the criticism of outstanding cardiologists.

Similar guides covering syphilis, child development, and tuberculosis have recently been revised and, although intended for the nursing staff of the A.I.C.P., they will readily be of interest to a wider circle.

Set-Up and Budget for Public Health Education*

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MODERN public health practice has shown how to prevent much unnecessary sickness and premature death and how to maintain and promote personal and public health. How can the necessary factual information be brought to public attention in such a manner as to produce action? Able direction of a well organized and financially supported health education program for the state and local areas is essential. The major purposes are: to make health information public by technics which arouse, stimulate, and guide motives for healthful living; to provide the members of a community with an understanding of the functions and services of a health organization, of the community responsibilities for public health work, and of the opportunities of individuals and groups to insure adequate support of essential public health services.

There is no single formula for a "set-up and budget" for public health education. Conditions vary enormously in different communities or localities. Certain basic principles have been developed which are subject to review periodically as new discoveries are made or new technics are found practical. The importance of periodic evaluation of health education programs is becoming increasingly recognized, but methods of evaluation have been only partially developed.

RESPONSIBILITY AND TEAM WORK

A comprehensive health education program embraces at least 3 closely related phases: (1) popular health instruction, (2) health education for professional groups, and (3) school health education. To fulfil the obligations of this threefold program, and to provide opportunity for coöperative study and future planning, the various features may well be correlated and developed through a public health education council. Such a council may be formally organized as an independent group or as a part of a community health council, or it may merely take the form of informal conferences of representatives of the community agencies interested in health education.

The ultimate responsibility for community health education rests with the health officer or someone selected by him who has experience and training for the task. Even though health education work in schools is the major responsibility of the education authorities, the health officer should supply current information regarding health conditions, and aid in the provision of available services for health education of teachers and pupils. The state department of health likewise has a responsibility to serve as an advisory and

* Read before the Public Health Education Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 9, 1935.

correlating force, and to provide some basic tools for health education work. In addition, the state department can pass on to the local communities the valuable materials and methods developed by national health agencies.

CLARITY IN PLANNING

Bertrand Brown has defined 4 basic tasks in health education which are applicable to the 3 phases of a health education program. These are indicated by the 4-part question: (a) What ideas, images, and emotional appeals must be conceived, accumulated, arranged, set forth, and produced; (b) transmitted through what medium, or by what means; (c) to what audiences, in what locality or localities; (d) to accomplish what objectives?

In order to plan health education work intelligently, and to pursue it economically and effectively, each of these 4 fundamental tasks, closely related, needs consideration.

OBJECTIVES BASED ON STUDY

Advance preparation of a carefully considered program is essential to good work. The basis for program making is a study of the situation to determine the major factors involved, the public response desired, and the necessary procedures. The objectives should then be definite and reasonable. For example, the health officer should have clearly in mind what he wishes the people to do as the result of health advice. The final test of health education is not how much information is distributed, but how behavior is influenced. The objectives should have importance locally and be attainable with the facilities at hand. The technic of gaining public attention and of producing action is an art and a science, requiring a knowledge of human motivation, of human interests, and of human actions.

COMMUNITY PARTICIPATION

Having studied the community, the next steps are the enlistment of community forces, the selection of subject matter, and the development or utilization of technics of application of various methods. Methods should be selected for reasons of economy—with a view to reaching the largest numbers effectively at the smallest expense; for attention value, to reach persons under conditions which are favorable to secure attention; and for their suitability to the subject matter. For example, some topics lend themselves to exhibits, others to the newspaper, others to classroom projects.

The selection of material to be presented to the public, including professional and school groups, will depend upon local circumstances. In addition to general health information which is aimed to build up a better public understanding, advice may be given regarding specific problems such as special disease hazards or the pressure of nursing services. An understanding of problems and opportunities is necessary to bring about intelligent action regarding the maintenance of qualified personnel and an adequate budget.

There are several important groups to be kept informed for whom the objectives and methods vary. These groups include: (a) responsible citizens, (b) public officials, (c) medical and related groups (doctors, dentists, nurses, hospital staffs, veterinarians), (d) recreation and social workers, (e) school teachers, (f) clergy, (g) children (schools, 4H clubs, etc.), and (h) the general public.

In considering the set-up necessary for health education work, attention must be given to the methods which are suitable for each group to be reached. Too little has been done with the prominent citizens, business and club leaders, and public officials, whose un-

derstanding of the opportunities and services is necessary to insure support of public health activities. Through these groups may be developed informed public opinion, aid in specific matters of program and budget, and channels of sound information regarding public health within a community. Methods which may be used include personal contacts of health personnel, health talks, committee participation, exhibits, motion pictures, distribution of annual reports, periodic bulletins, pamphlets or special books on health subjects, and press releases.

With medical and related groups, a primary objective is to secure improved and wider utilization of preventive medical services. The advice and assistance of these bodies are fundamental for success.* As with the school teachers, the clergy, welfare workers, and other professional groups, the individuals must be kept informed to enable them to discuss and interpret effectively the work of health organizations. For the broad community phase of the program, there must be staff talent to prepare or to secure attractive and authentic printed material of various kinds, and to stimulate volunteer leadership and participation.

As defined by the fourth health education institute, the school health program aims to establish habits, practices, and attitudes toward health which will carry over into adult life and enable the individual to function as a healthy person. A division of school health education, built around a supervisor for a county or city, and a director for a state, the work being correlated with the health department and other health agencies, is an essential factor in the development of a well rounded community program. To enlist community participation, then, a well conceived educational program must be based on material of accurate fact, properly interpreted. A calendar of projects for the year, somewhat flexible, is a useful guide.

* Medical associations are helping in constructive programs of health education in many localities. The American Medical Association, through a special division, and national health agencies are rendering valuable service.

PERSONNEL AND BUDGET

For many years there has been much study and experimentation in public health education. The organization of an effective program in a community depends in no small degree upon the resources of the health department and the initiative and ability of the health officer. In the smaller communities, popular health instruction work may be entirely directed by the health officer, who may utilize civic and professional groups for assistance and advice. The school health education services may be supervised and coördinated by a well trained worker with educational background and organization ability serving on a county-wide basis, and working closely with both the education and health organizations of the county and state.

In cities of 100,000 population or over, the health officer will need the assistance of a popular health instruction director or supervisor, with a staff suitable for the size of the community. This person should understand the facts to be given to the public, have organization ability and newspaper sense, be familiar with the useful free material available, and be able to utilize statistics and other source data in a practical manner. Most of the budget for this work will be for salaries, including stenographic service, with a reasonable allotment for materials. Except in the largest cities, most of the printed material and exhibits will be obtained from sources other than the local health department.

From 2 to 3 per cent of the total public health budget (4 to 6 cents per capita per year) would seem to be a

reasonable amount to set aside for the purpose of popular health instruction in addition to the provision of a division of school health education. The latter may be so organized that the supervisor is the liaison officer on health affairs between the school and other community health agencies, as well as the nucleus around which health work in the schools may be developed. Here again, most of the specialized budget will be for the salary item. As the principals and teachers become more and more familiar with public and personal health principles, they can assume increasing responsibility for many details of health education to be furthered in the regular curriculum.

State departments of health have been gradually adding public health education divisions or services to the administrative organizations with beneficial results. In 1930, the proportion of the health department appropriation in 11 states varied from 0.5 per cent to 7 per cent, with a median of 2.2 per cent. Twenty-five states in that year conducted this work in the executive or central administrative office. There is a growing tendency on the part of state departments of health to form some type of liaison arrangement with the educational authorities whereby improved courses in hygiene are incorporated into the educational system. There is also a growing tendency to use the educational system for the promotion of general health education work. Increasing attention to the health aspects of the school program given by teachers colleges and boards of education should provide increased personnel resources, and may gradually modify existing programs of both the school and community health departments as they relate to health education.

Public health education is a relatively young and rapidly developing field of public health activity. There is yet much pioneering and discriminating study to be done. Emphasis is properly being given to the psychological aspects of the problem and to many other related subjects. Patience, perseverance, and confidence in the ultimate possibilities are required of the workers to provide a stable program, properly integrated with the other essential features of community health work.

Bullock County, Ala.

IN connection with the Rural Health Conservation Contest a rather unusual activity for Chamber of Commerce Health Committees was recently undertaken by the Health Contest Committee of Bullock County, Ala., of which committee Judge W. E. McNair is Chairman. The committee undertook the publication of a 12 page bulletin on Good Health, containing vital statistics data, information on the use of Burr cottages for the care of tuberculosis cases, with general control measures, sanitary type of privies, rodent control, mosquito control, rabies control, and with special data on the health activities of the county schools and the county health department.

Veterinary Service in the Control of Dairy Products *

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IN terms of human welfare, milk and milk derivatives affect more generally and more closely the daily lives of men, women, and children in this country than any other food product. As a corollary, the relation of veterinary science to public health is best exemplified in the veterinary aspects of milk control. The story of safe milk as a factor in promoting human health has been signalized, dramatized, and advertised, but the consuming population is only partly conscious of the affiliation between the medical sciences, their correlated activities, and the wholesomeness of the dairy products made available.

The tremendous progress made in the development of safe milk supplies and the part played by safe milk in improving our health status make an absorbing story. It is a story of research and observation, of putting to work facts revealed by patient research, and finally of practical application of accumulated knowledge and experience to the everyday problems of milk production and distribution. It is a story to which many branches of science, the professional health worker, and the dairy industry itself, have contributed about equally.

The scope of this paper is a discussion of veterinary science and veterinary service in the control of dairy products. Recognition of the fact that certain infectious diseases of cattle are transmissible to man through milk, also that some less specific conditions, particularly of the lactating udders of cattle, may render milk unwholesome for human use, has served to focus attention upon a fundamental of pure milk, namely, the health of dairy cattle. These facts, along with the problem of human disease transmissible through milk, have necessitated the development and interposition (between the producing animal and the consumer) of protective measures, especially pasteurization, in order that the general market milk supply may be adequately safeguarded.

VETERINARIANS AND THEIR GENERAL ACTIVITIES

In reviewing the veterinary aspects of milk control, the outstanding contribution which the profession has made to the creation and development of safe milk supplies is seen in the control of bovine diseases by private and organized veterinary agencies. In order to visualize how these activities have been and are carried on, a bird's-eye view of the veterinary profession as it exists in this country will be helpful.

A survey [1] made a few years ago by

* Read before the Laboratory Section at the Sixty-fourth Annual Meeting of the American Public Health Association in Milwaukee, Wis., October 10, 1935.

the Committee on Education of the American Veterinary Medical Association showed that there are between 12,000 and 13,000 graduate, registered veterinarians in the United States, of whom about 9,400, or roughly 75 per cent, are engaged in private practice (Table I). In animal disease control, the practising veterinarian serves as the first line of defense as does the practising physician in human disease control. Of the remaining 3,000 to 4,000 veterinarians, about 1,400, or a little less than 12 per cent, are engaged in U. S. Bureau of Animal Industry and other federal work, and about 700, or a little more than 5 per cent, in state bureaus of animal industry. About 1,000 veterinarians are engaged in teaching, commercial, municipal, and army activities.

TABLE I

LINES OF WORK ENGAGED IN BY VETERINARIANS [1]

	Number	*Per Cent*
Practice	9,359	76.5
Army	126	1.0
Bureau of Animal Industry (Federal)	1,353	11.1
Other Federal Work	60	0.5
State	660	5.3
Teaching	230	1.9
Commercial	250	2.0
Municipal	202	1.7
Totals	12,240	100.0

The survey, which represented a very complete analysis of the veterinary situation from the educational and professional standpoints, also indicated the average distribution of time given to various species by a representative group of practising veterinarians (Table II).

It is significant in connection with our consideration of dairy products that the modern practising veterinarian gives, on the average, more of his time to cattle than to any other species.

There are a number of activities relating to milk control which require either the employment of veterinary personnel or the coöperation of agencies whose professional staff is composed principally of veterinarians. Chief among these are:

TABLE II

DISTRIBUTION OF TIME GIVEN TO EACH SPECIES BY PRACTISING VETERINARIANS [1]

	Per Cent
Cattle	38.0
Pets	23.9
Horses	18.5
Swine	14.1
Poultry	3.0
Sheep	2.3

1. *Control and eradication of bovine disease under official supervision*—This work is carried on and participated in by (1) the U. S. Bureau of Animal Industry working coöperatively with (2) state bureaus of animal industry, or state livestock sanitary boards; these agencies employ in addition to their full-time veterinary personnel (3) many practising veterinarians on a part-time basis.

2. *Milk and dairy inspection under official supervision*—This work is participated in by: (1) veterinarians employed full-time by state and municipal departments of health or other agencies charged with regulation of milk supplies; and (2) practising veterinarians authorized to make dairy herd examinations.

3. *Milk and dairy inspection work carried on by producer and distributor organizations*—This work is voluntary and relates principally to milk quality improvement and disease control, principally of mastitis, among dairy herds. It is carried on by veterinarians employed full- or part-time by commercial milk organizations to do field inspection and educational work with milk producers. It is an important adjunct in many areas to the official milk inspection program.

There are other ways in which veterinary activities are correlated with dairy products control but these are of major importance.

1. Control of Bovine Diseases and Safe Milk

The safety of milk is determined chiefly by 4 factors: (1) the health of dairy cattle, (2) the health of dairy employees, (3) methods of producing and handling milk to prevent contamination, and (4) the additional protection—effective pasteurization—which is necessary in order that the general market milk supply may be adequately safeguarded. It is conceded that healthy dairy herds are a fundamental without which the development of our milk supplies to meet consumer needs would be extremely unsound and unstable.

We have a vast fund of information on the origin and nature of diseases of the dairy cow; on methods of diagnosis and methods of identifying the causative organisms; on the communicability of certain of the diseases to other animals and to man; on methods of control and eradication. Most of this has come to us in the last 4 decades as the result of research which now forms the basis for nation-wide programs of disease control among dairy cattle. Sufficient of this knowledge has been applied on a scale which not only enables us to foresee the future but also to view in retrospect the accomplishments to date.

BOVINE TUBERCULOSIS

Bovine tuberculosis is the best example of an animal disease communicable to man which may soon cease to exist here as a danger to human or animal health. The story of bovine tuberculosis and its relation to human health—particularly child health—has been told too often to require repetition. We should be equally familiar with the federal-state program for elimination of bovine tuberculosis that has been under way since 1917.

The first tuberculin test of dairy cattle was conducted in this country in 1892. Thereafter it was applied to ever-increasing numbers of cattle by private veterinarians and the state and federal bureaus of animal industry. As a group, certified milk herds were the first to require regular tuberculin tests; this was done shortly after the introduction of tuberculin as a diagnostic agent. In 1917, the movement received its first real impetus when the federal-state coöperative program embodying the uniform accredited-herd plan was adopted and provision made for payment of indemnities for slaughtered tuberculous cattle. This work proved very successful and was made still more effective in 1923 when the area plan of tuberculin testing was put into effect.

In the 19 years from 1917 to 1935, more than 150 million tuberculin tests were made on cattle and about 3¼ million reactors removed from the herds and slaughtered. As a result, on May 1, 1935, 2,237 counties, or 72.8 per cent of the 3,071 in the United States, were classed as modified accredited areas (areas in which there is less than 0.5 per cent bovine tuberculosis). Twenty-five whole states are now designated as modified accredited areas (Arkansas, Colorado, Florida, Idaho, Illinois, Indiana, Kansas, Kentucky, Maine, Michigan, Minnesota, Missouri, Nevada, New Hampshire, New Mexico, North Carolina, North Dakota, Ohio, Oregon, Utah, Virginia, West Virginia, Washington, Wisconsin and Wyoming).

Perhaps many of us are not aware of the marked effect which this work has had upon the human death rate from tuberculosis. State and city health officials have vigorously backed up the tuberculin testing program of

TABLE III

DEATH RATE FROM TUBERCULOSIS IN THE UNITED STATES

Calendar Year	Respiratory Tuberculosis	Other Forms	Cattle Tested Fiscal Year June 30	Number Reactors	Per Cent Reacting	Per Cent Retained
1900	180.5	21.4				
1901	174.5	22.4				
1902	162.6	21.9				
1903	164.9	23.6				
1904	176.2	24.5				
1905	166.7	25.6				
1906	155.6	24.6				
1907	154.3	24.2				
1908	144.0	23.6				0.88
1909	137.7	23.4				1.27
1910	136.0	24.3				1.42
1911	132.7	26.5				1.57
1912	125.0	24.7				1.98
1913	123.0	24.8				2.02
1914	123.5	23.7				1.98
1915	123.5	22.8				2.11
1916	119.9	22.2				2.35
1917	124.6	22.5	20,101	645	3.2	2.11
1918	128.6	21.4	134,143	6,544	4.9	1.80
1919	107.5	18.1	329,878	13,528	4.1	1.57
1920	97.0	17.0	700,670	28,709	4.1	1.62
1921	85.6	13.3	1,366,358	53,768	3.9	1.62
1922	84.3	12.1	2,384,236	82,569	3.5	1.76
1923	81.3	11.5	3,460,849	113,844	3.3	1.75
1924	78.0	11.7	5,312,364	171,559	3.2	1.56
1925	75.9	10.8	7,000,028	214,491	3.1	1.51
1926	76.6	10.7	8,650,780	323,084	3.7	1.41
1927	71.4	9.5	9,700,176	285,361	2.9	1.15
1928	70.3	9.0	11,281,490	262,113	2.3	1.04
1929	67.6	8.4	11,683,720	206,764	1.8	1.00
1930	63.4	8.1	12,845,871	216,932	1.7	0.75
1931	60.7	7.5	13,782,273	203,778	1.5	0.62
1932	56.6	6.4	13,443,557	254,785	1.9	0.49
1933			13,073,894	255,096	2.0	0.42
	Totals		115,170,388	2,693,570	2.3	

(Official Statistics compiled by H. R. Smith, Livestock Commissioner, National Livestock Exchange)
The relationship of the number of cattle tested in the United States, the reactors slaughtered, the decline in percentage retained for tuberculosis (lesions found on post-mortem) of all cattle slaughtered, exclusive of reactors, and the decline in the human death rate from respiratory and other forms of tuberculosis per 100,000 population in the United States. The federal and state coöperative testing program started in 1917. This is from data furnished by the U. S. Bureau of Animal Industry and the Division of Vital Statistics, Bureau of the Census.

the state and federal bureaus of animal industry which has resulted in reducing the number of positive reactors in cattle from 4.9 per cent in 1918, to 1.1 per cent for the year ending June 30, 1934. This support has been forthcoming because of evidence such as that given by Park and Krumwiede [2] and others that the bovine tubercle bacillus causes about one-tenth of the bone, joint, and lymph node tuberculosis in adults, and one-fourth of this type of tuberculosis in children. In young children it is said to cause from 6⅓ to 10 per cent of the total fatalities from tuberculosis.

H. R. Smith, Livestock Commissioner of the National Livestock Exchange, has called attention in a con-

vincing manner to the changes in the death rate from tuberculosis in man since 1918. He has compiled official statistics[3] from the U. S. Bureau of Animal Industry relating to tuberculin tests of cattle, percentages of reactors and percentages of other cattle "retained" after slaughter, along with data from the Division of Vital Statistics, Bureau of the Census (Table III). The human death rate from respiratory tuberculosis in the United States in 1918 was 128.6 per 100,000 population, but it has decreased every year since then, and last year was 56.6, or less than half the rate in 1918. During the same time the death rate from tuberculosis other than respiratory declined from 21.4 per 100,000 in 1918, to 5.9 in 1933. It is not claimed that this was due entirely to the cooperative program of the government for the eradication of bovine tuberculosis death rate, but it is significant that during the 18 years prior to 1918 the death rate from tuberculosis other than respiratory did not decline; in fact, the trend was slightly higher: 21.4 per 100,000 in 1900, and 22.5 in 1917, with no fall below the 1900 rate in the intervening years. Commenting on these figures, Smith says:

> According to medical authorities, cases of human tuberculosis other than respiratory such as glandular, bone, and abdominal are to a large extent of bovine origin. The decline in the death rate from respiratory tuberculosis from 1900 to 1918 is probably due to improved sanitation and medical care. It is apparent that this was offset in its affect on other forms of tuberculosis by the increase in this disease in cattle during that period, as indicated by the increased percentage retained. While there was no decline in the death rate from non-respiratory tuberculosis from 1900 to 1917, when the federal and state coöperative cattle testing was started, the decline in the death rate from such types has since been pronounced.

This analysis does not take into account the concurrent effect that increased pasteurization of milk supplies has had since 1918, which is considerable in those states where the process has been rapidly expanded in recent years. The observations of Park in New York City indicate marked reduction in human infections with bovine tubercle bacilli since pasteurization was applied to all milks except certified.

Nevertheless, a greater decline in the bovine type of infection in humans has been noted after the tuberculin test of *all* dairy cattle was required for *all* grades of milk than when pasteurization alone was depended upon for protection. The moral is obvious.

THE USE OF MILK FROM TUBERCULIN TESTED HERDS

As the tuberculosis eradication program has progressed, the number of cities and states which demand milk from tuberculin tested cows has increased rapidly. Within the past year tuberculin testing has proceeded so rapidly that an accurate estimate of the amount of so-called "tuberculin tested" milk cannot be made. However, in the 5 years, 1927–1931 inclusive, the amount of such milk in cities of 10,000 and over increased from 68.1 to 88.7 per cent, or more than 20 per cent. Effective pasteurization will kill bovine tubercle bacilli, but the requirement that dairy herds shall be free from tuberculosis even if the milk is to be pasteurized recognizes the principle that processing methods cannot replace proper standards of health for dairy animals.

The relation of veterinary science to the safeguarding of milk supplies from the menace of bovine tuberculosis has been reviewed at considerable length because it symbolizes what may be done by joint action in surmounting risks to human health. The responsibility for sanitary control of milk supplies rests, as it should, very largely on medical and other professional health officers; the veterinarian serves as the qualified

instrument to carry out measures for animal disease control.

BRUCELLOSIS IN ANIMALS AND MAN

Bang's (abortion) disease is another common infection of dairy cattle caused by an organism sometimes capable of infecting human beings. Brucellosis of man and animals seems of greater current interest to health authorities than bovine tubercle infection. Since a certain proportion of Brucella infections in man is acquired through raw dairy products, the efforts to control the infection in cattle are relevant to any discussion of the veterinary aspects of public health.

Although Bang's disease has been continuously studied since the discovery of the causative organism in 1896, the most intensive efforts to work out methods of control and elimination have been applied during the past decade. The agglutination test is a reliable means of detecting Brucella infected animals. When repeated at suitable intervals by experienced operators, followed by the removal of reactors, the test is a dependable method under favorable circumstances of ridding herds of the infection. Cotton and his associates [4] of the U. S. Bureau of Animal Industry, have shown that the blood-serum test in competent hands gives more reliable information regarding udder infection with *Brucella abortus* than the milk serum test; also, that a blood-serum titer of 1:1,000 nearly always indicates udder infection; at 1:200, about 50 per cent of the animals so reacting have infected udders; at 1:100, cows rarely show infected udders unless they have recently been infected and have not reached their maximum agglutination titer. Repeated tests will detect such animals.

Several other investigators have reported similar observations so that, from the public health viewpoint, it may be concluded that dairy herds effectively maintained free from reactors to the agglutination test at 1:100 or higher, present little, if any, danger of transmitting brucellosis; exceptions are very rare. Not all cases of brucellosis in man are caused by the bovine type of infection or by infected milk, but the number is sufficient to require that adequate protection be given milk consumers. This protection is furnished by removal of all infected cattle from dairy herds, by pasteurization, or by a combination of these methods.

Much more information, especially much better epidemiological evidence, is needed in order to evaluate with accuracy the importance of Bang's disease to human health. Lacking this information, one cannot visualize the extent to which public health and animal health agencies will combine in supporting an elimination or control program against the bovine disease. In the case of bovine tuberculosis, the eradication program received its greatest stimulus and greatest support, both scientific and legal, on account of human health implications. In Bang's disease, the public health aspects are not yet so clearly defined although the economic aspects are quite fully recognized by the livestock industry.

When the health and economic phases of Bang's disease have been more fully appraised, it should be possible to decide whether or not the nation should embark upon a wholesale eradication program as was done with bovine tuberculosis, or work out other control methods, including immunization of dairy animals. In any event, the final responsibility for carrying out whatever measures are adopted will fall very largely on veterinary agencies.

Of interest in the consideration of undulant fever at this time is the federal Bang's disease testing program that has been carried on for over a year as one of the emergency measures

of the Agricultural Adjustment Administration. Originally designed to reduce dairy cattle populations and thereby milk surpluses, the A.A.A. allotted funds to the U. S. Bureau of Animal Industry for disease control work which was broadened to include Bang's disease. The tests have been conducted more or less actively in all but 2 states since July, 1934. The federal government has paid indemnity to the owners of reacting cattle, amounting to not more than $50 each for pure-bred, and from $20 to $25 for grade cattle.

A summary of this work to June 30, 1935, shows that more than 3,300,000 cattle have been tested, of which 381,000 were found to be reactors (complete agglutination in dilution of 1:100 or above). These figures include a considerable number of retests. On initial tests all over the country, the average reactor rate has been 14 per cent of the cattle under supervision. Infection has been found in about 43 per cent of the herds tested.

Funds have been allotted so that this work can be continued to July 1, 1936. It is hoped that many of the dairy herds, under proper supervision, will be maintained free from abortus infection. Some states already have made provision to add to the federal indemnity or to carry on the program after the federal assistance ceases.

The foregoing considerations of bovine tuberculosis and Bang's disease are illustrative of what may be done by veterinary research and veterinary supervision in protecting milk supplies from animal contagions. There are other less common diseases of dairy animals which are kept in check or not permitted to retain a foothold in this country. Foot-and-mouth disease is one of the most highly contagious diseases for cattle; man is somewhat, although not particularly, susceptible to the infection either by direct contact or through drinking infected milk. Children are more susceptible than adults. On the few occasions that foot-and-mouth disease has gained entrance to this country, it has been eradicated as promptly as possible by complete destruction of infected and exposed herds. Thus, through the operation of veterinary police measures, foot-and-mouth disease does not exist in the United States either as an animal disease or public health problem.

2. Official Milk and Dairy Inspection Service

State and city health departments all over the country quite commonly employ veterinary personnel to carry on certain phases of milk control work. In some instances, these veterinary activities are related solely to disease control supervision to see that the local requirements with respect to tuberculin tests, physical examinations, etc., are observed in the dairy herds comprising the milk-shed. In others, the veterinary personnel is charged with all phases of dairy inspection work, covering the herd, the stable, and other physical equipment, and production and handling methods.

3. Industrial Milk and Dairy Inspection Services

One of the prominent characteristics of modern milk supplies has been the development by producer and distributor organizations of their own inspection and control services. The desire of, or the necessity for, commercial organizations to foster quality improvement work is an outgrowth of healthy competition and the increasingly complex official requirements and regulations with which health departments have surrounded milk supplies, particularly in our metropolitan areas. The sum total of the benefits derived in terms of better educated dairymen, healthier herds, better dairy facilities,

and higher quality milk is tremendous. With the aid of these commercial inspection services, the compliance of dairy farmers with local regulations has been greatly facilitated in many instances. Through the field inspection work carried on by milk distributing organizations, the meaning, importance, and necessity of many milk regulations have been translated to milk producers more effectively perhaps than would have been the case otherwise.

Bonuses offered to producers for higher fat, lower bacteria count milk, and for improved dairy facilities have resulted in constantly improved milk supplies. Veterinary field work by distributor organizations has also been extremely helpful in showing the dairy farmers the advantages of tuberculin testing, of mastitis control, and of dairy hygiene and sanitation in general. The grading system with its higher prices for better quality milk has had a salutary effect on those milk sheds where it has operated. Veterinary personnel has been one of the principal media through whcih the programs have been put into operation.

It has been impossible to determine accurately the extent to which veterinarians and veterinary agencies contribute essential services in the control of dairy products. It is certain, however, that a survey would show a long list of activities and accomplishments in addition to those discussed.

Space does not permit more than brief mention of the work already done and to be done in the control of bovine mastitis. This disease certainly occupies front rank among bovine ailments in its effect upon the quality and economic phases of milk production. Its public health implications are less well defined except on the general principle: milk from cows having mastitis, whatever the cause, is not fit for human consumption. This principle necessitates a workable definition of mastitis of a degree significant to public health and milk quality. I shall not attempt the definition but would call attention to the frequent misunderstandings and mis-statements relative to mastitis and the streptococci which are commonly associated with it. The statement, "Milk containing large numbers of mastitis streptococci causes outbreaks of septic sore throat and scarlet fever," is misleading unless it be qualified with the explanation that the infecting organisms in such cases must be human pathogens and not the variety commonly found in bovine mastitis. As Brown has expressed it [8]:

> Streptococcal bovine mastitis is very prevalent. It appears in all herds from time to time and is present most of the time in all herds of more than a few cows. The streptococci found in bovine mastitis may be hemolytic or non-hemolytic but there is no evidence that those found in most cases of mastitis are pathogenic for man.

And again,

> The evidence at hand indicates that milk-borne epidemics of streptococcus infection in human beings are caused not by bovine streptococci but by human strains which may become implanted into the udder of the cow. . . . Milk from cows with mastitis should not be used for human consumption, and no person with a hemolytic streptococcus infection should be allowed to handle the udder of a cow.

More and more each year, the attention of those interested in wholesome milk is focused on mastitis and its control. For years the subject has received the attention of veterinary research workers, of medical and other health officials, of dairy bacteriologists and dairy husbandrymen, and of nearly everyone either closely or remotely concerned with milk in any of its phases. It deserves continued study from all angles, for out of the accumulated information we may expect workable methods of control. Much progress has been made and, in the final analysis, veterinary forces will prob-

ably be called upon, as is already the case in many places, to carry out diagnostic, educational and control measures.

In conclusion, it is evident that veterinary service in the control of milk and dairy products embraces wide and varied fields of activity.

Veterinary service includes the application of control and eradication measures to bovine plagues transmissible to man through milk, as exemplified by bovine tuberculosis. This is an example of joint effort under federal-state guidance in which thousands of official and private veterinarians have participated.

The service includes administrative and inspectional duties under state and local health departments in the enforcement of milk sanitary codes, especially with respect to disease control among dairy herds.

Still another branch includes the veterinary service carried on by private and commercial milk organizations in quality control work among milk producers; this phase has proved one of the most effective and beneficial in the development of improved milk supplies.

Finally, but perhaps most important, are the everyday contacts between practising veterinarians and herd owners in maintaining herds on a healthy and, hence, economic basis.

The primary responsibility for control of milk quality as it affects public health rests largely with medical and other officers of established health department agencies. In discharging the responsibility, a considerable share depends upon the utilization of veterinary personnel and coöperation with veterinary agencies. The extent to which veterinary personnel and veterinary agencies are called upon to perform essential services in milk sanitation depends upon the ability and qualifications of the profession in this field.

The basic and specialized training in veterinary science qualifies the profession in one of the most fundamental aspects of milk hygiene, namely, the health of dairy animals. Superimposed on this basic training in our institutions of veterinary education, are courses in hygiene and sanitation, dairy husbandry, the physical, bacteriological, and biochemical properties of milk, and other instruction which should render veterinary graduates especially well fitted to contribute real service in the development of pure milk supplies. It seems essential that such additional training in hygiene and sanitation should be continued and broadened. In this way, veterinarians and veterinary agencies may be even better qualified and more effective in conserving the interests of animal husbandry and public health through pure milk.

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A System of Codification of Medical Diagnoses for Application to Punch Cards, With a Plan of Operation*

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THE system of coding, which is described here, is an attempt to combine in a single scheme provision for two functions, which are related but not identical: first, the cross-indexing of medical conditions, so that medical histories may be obtained from the storage files, in specified groups, for research purposes; second, the issuing of periodic statistical summaries of medical conditions seen during a definite period of time (yearly reports). While, broadly, these two functions can be thought of as parts of a single comprehensive system of keeping account of medical records, practical considerations make it desirable to plan separately for the needs of the two uses. A few examples will serve to clarify the point.

So far as providing that the record of a given case will be available when it is wanted for study of particular subjects, all that need be done is to enter this record under all the relevant categorical headings representing these subjects. If a given set of diagnostic terms is attached to a history, so far as cross-indexing is concerned, one need not attend to the relative importance or certainty of the various diagnoses, but only to the complete entering of the record under all relevant diagnostic phrases. Thus, to give a simple example, if the diagnostic report in a case reads " carcinoma of bronchus?—or possibly thymic tumor " the case should be cross-indexed under both Carcinoma, bronchus and Tumor, thymus. Anybody who later studies either of these conditions should see this history. On the other hand, for the purpose of statistical enumeration, this would be the worst conceivable disposition, for it would lead to a count of two diagnoses, one, carcinoma of the bronchus, and the other, thymic tumor; whereas, the diagnostician did not mean that the individual was suffering from both conditions, but only that he was uncertain as to which one. For statistical purposes one would have to decide to count the case as one of carcinoma of bronchus, or one of thymic tumor, or one of undefined diagnosis. Another point is that for purposes of drawing individual groups of histories, it is desirable to keep account of certain details, which if included in a general statistical report on all cases, will only tend to clutter it up with small groups and cause confusion. For instance, for purposes of cross-index reference, one may wish to keep distinct, cases of " direct inguinal hernia " from cases of " indirect inguinal hernia," and " recurrent hernia " from " nonrecurrent

* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 9, 1935. The scheme here described is modified for more general application from one in use at The Mayo Clinic.

hernia," but these details may be undesirable for a general report. At the same time, provision must be made that a case of recurrent, direct, hernia shall not be indexed in such a way that it is not distinguished from two cases, one with a diagnosis of direct, and another with a diagnosis of recurrent inguinal hernia and so enumerated as two cases. This point assumes the greatest practical importance if diagnoses have been subdivided into refined subvarieties in the scheme of diagnoses used. For instance, if rheumatic heart disease is subdivided into rheumatic pericarditis, rheumatic mediastinopericarditis, rheumatic myocarditis, rheumatic endocarditis, and so forth, then each of these must be given an independent numerical designation.

If, now, a patient presents a combination of these rheumatic cardiac conditions which in general will be the case, there will be several numbers to assign, and the patient will be counted several times instead of once for what is actually a single condition. Finally, and perhaps most importantly, for purposes of drawing out defined groups of histories to be studied, there is no great significance to the particular order in which the records are kept. It makes no difference whether the records of cases of osteomyelitis are obtained from an alphabetical list under the letter O, or from an anatomic ordering under "bone," since all one wishes, is to get the records of cases of osteomyelitis. However, if all the diagnoses are to be enumerated in a consecutive listing, the ordering and groupings of the list have to be such as to make it intelligible. Furthermore, if the list is to be used for comparative studies, the separate rubrics contained in it should be defined on some standard basis. If one is to prepare for the report of all cases, therefore, one has to deal with a fundamental consideration of the designation of defined rubrics, and in what order they should be arranged, that does not even arise in preparing for cross-indexing. These examples do not by any means exhaust the problems involved in adopting a code to both cross-index and summary enumeration purposes, but they will serve to focus the reasons for some of the particular details included in the coding scheme which follows.

PRINCIPLE OF SCHEME

The principle on which the scheme is built is as follows: The function of summary statistical enumeration (yearly reports) is relegated to a numbering system which occupies 3 columns for what I shall call the "main number." In combination with this, I use a numbering system which occupies 2 additional columns for what I shall call the "subnumber," which performs the rest of the functions of the system. The subnumber is coded in a unique way, for certain definite reasons which will be explained later. Each diagnostic condition therefore is represented by a number combination which occupies 5 columns.

The Main Number—Since the main numbers will determine the rubrics and order of the general statistical report, the disposition of these numbers will depend on what order is decided on. The form of such a listing is necessarily always arbitrary. I have used the groupings and order of the *International List of Causes of Death*, not because that list recommends itself scientifically, but because it is the one which has, at present, the widest statistical application. However, it has been modified and amplified to accommodate it to hospital morbidity conditions.*

* It would be highly desirable to establish a standard form for reporting hospital morbidity similar to the *International List of Causes of Death*. The list used by The Mayo Clinic can be obtained upon request.

The Subnumber—The field for this occupies 2 columns. The coding applied to this subnumber does not follow the usual consecutive numbering that would permit 100 consecutive items in the 2 columns used. Instead, a number is assigned to each of the individual 12 punch positions in the 2 columns, giving a total of only 24 possibilities. I call this the "single-punch method of coding." The purpose of this method is to make possible the punching of multiple simultaneous conditions within each main number, in a single punching field. If the usual consecutive numbering system is used, multiple conditions will require multiple fields. In this method the same punching field can be used for multiple conditions within each main number. The following outline will make this clear:

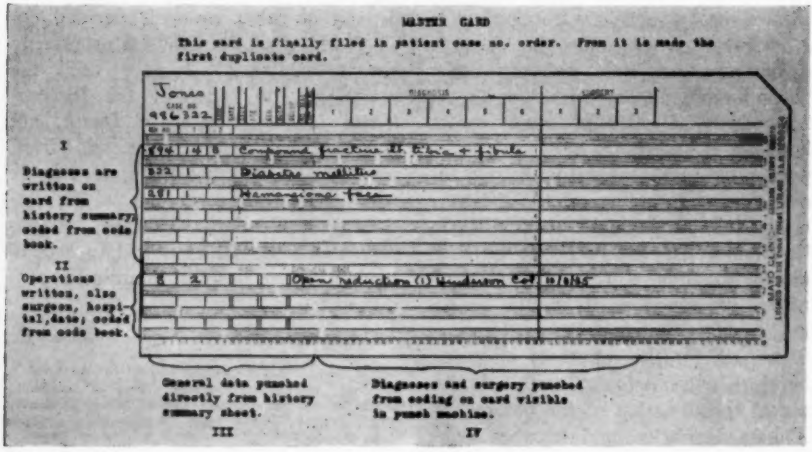
Main number	*Sub-number*	
687	1 —	Inguinal hernia, unmodified
687	— 1	Inguinal hernia, direct
687	— 2	Inguinal hernia, indirect
687	— 3	Inguinal hernia, recurrent
687	—13	Inguinal hernia, direct recurrent

In the last example, direct, recurrent, inguinal hernia is made up by adding the punches of direct and recurrent in the same column, that is, the numbers 1 and 3 are both punched in the second column of the subnumber field. This is possible because only a single punch is used in the subfield for each single specified condition. Advantages of this method are emphasized in the system here described because, as will be explained later, a duplicate card is made for each number punched in a separate field, and by reducing the fields punched it is possible to reduce the number of cards necessary.

OPERATION OF THE SYSTEM

1. *Master Card*—The diagnoses in a given case appear on a summary sheet which the clerk takes up for coding. A special card has been prepared (Figure I) with the punch areas shaded, and between these shaded portions the diagnoses are written in the words given on the summary sheet. A code book alphabetically arranged is provided, and each entry has its code number entered next to it. If the

FIGURE I—A sample master card. The Roman numerals give the order of procedure for completing it.


MASTER CARD
This card is finally filed in patient case no. order. From it is made the first duplicate card.
I
Diagnoses are written on card from history summary, coded from code book.
II
Operations written, also surgeon, hospital, date; coded from code book.
General data punched directly from history summary sheet.
III
Diagnoses and surgery punched from coding on card visible in punch machine.
IV

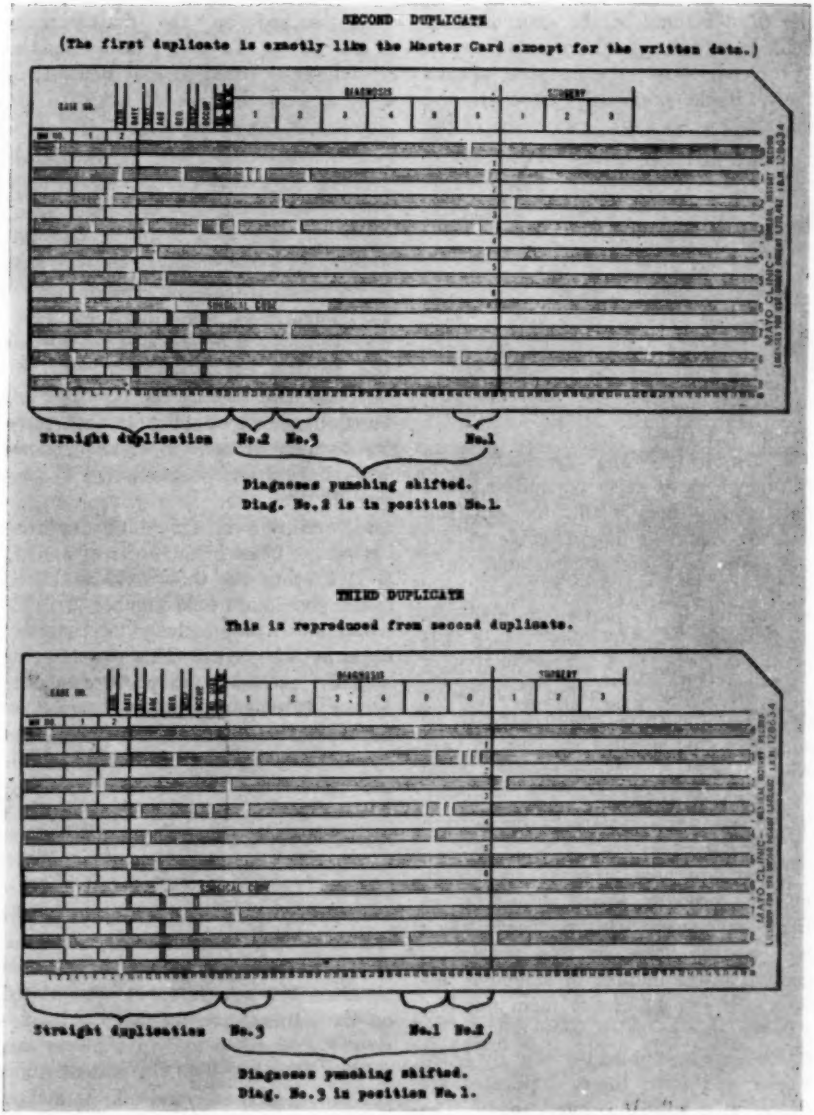


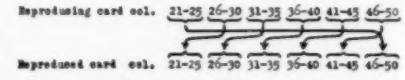
FIGURE II—The second and third duplicates made to complete the cards for the case illustrated in Figure I. Both duplicates are made with the mechanical reproducing punch machine.

condition is one to be included in the statistical summary, an x is punched in the third column of the main number field, in addition to the number shown in the code book. For instance, to take the example previously cited, if the diagnostic sheet says " carcinoma of the bronchus?—or possibly thymic tumor," the numbers for both diagnoses are punched, but only the carcinoma number has the x punched. There is room for 6 such diagnostic fields. When more are necessary, an auxiliary master card is prepared. There is also finally punched, in a column assigned for the purpose, the number of diagnostic fields which have been used; this is to facilitate the preparation of duplicates, which will be described.

2. *Duplicates*—The completion of the punch cards as so far outlined does not render them ready for practical use. It would be impracticable to sort the entire series of accumulated cards each time the records of cases corresponding to a particular diagnosis were wanted. Moreover, since the diagnosis in question might have been punched in any one of the 6 successive fields, all the cards would have to be sorted in that number of fields, a task which would be prohibitive if a large accumulation of cards was involved. Therefore, some system of duplication of cards is necessary.

There are now prepared from each master card, as many duplicates as there have been fields punched, which will be the same in this system of coding, as the number of diagnoses different in respect of the main number. All the master cards prepared as described, are assembled periodically (each week) and from these, duplicates are made on a special colored card. The reproducing machine of the International Machines Co. permits the easy duplication of cards with a transfer of columns. The duplicate is made in such a way that it has the diagnosis for which it is made, in the first diagnostic field, no matter in which field it was punched on the master card (Figure II). To accomplish this, the reproducer is wired so that fields 1, 2, 3, 4, 5, 6 of the reproducing card are punched in the order of 2, 3, 4, 5, 6, 1 on the reproduced card (Figure III).

FIGURE III—The scheme of wiring the reproducing punch machine for punching the duplicates in order to make the pertinent diagnosis appear always in the same columns.



Thus, diagnostic field 2 is shifted to the position of field 1. If 3 or more fields have been punched, the second card is now used as the reproducing card, resulting in the third duplicate having the fields in the order of 3, 4, 5, 6, 1, 2; thus the third field is shifted to the position of field number 1. This is continued progressively for as many fields as occupied.* This procedure is actually extremely easy, because the number of diagnostic fields occupied on the master card has been punched in a special column, and the master cards are first sorted on this column to determine how many duplicates are to be made. I have found that about 1,500 master cards can be duplicated, sorted, and filed in less than 2 hours.

3. *Filing of Cards*—When the duplicating process is completed, we have the master cards and the duplicates to file. The master cards are ordered on the patient case number (not diagnoses), and are placed in a file in this order. Here are kept, in patient number order, consecutively, all the master cards with all the diagnoses written on them. The duplicate cards are ordered

* Where more than 6 diagnoses have appeared on the summary sheet, an auxiliary master card has been made, so that the operation of making duplicates is the same.

on the 3 columns of the main number in the first diagnostic field (all the relevant diagnoses are now in the first field on the duplicates) and are placed in a file of duplicates, each set of cards corresponding to a particular main number behind a tab card bearing this number.*

4. *Utilization of Cards After Filing*—Cross-index. If one is concerned with obtaining, for research reference, the case number of histories corresponding to, say, indirect inguinal hernias, which were recurrent, one determines the number for this, which is 687—13. All the duplicates under tab number 687 are removed from the file, and by using the selecting mechanism of the sorting machine, the cards with punches 1 and 3 in column 5 are selected. The selected cards are now ordered on patient case number, and by using the "controlling" device of the tabulator, a list is obtained of case numbers in order, each case appearing only once no matter how many duplicates (visits) this patient has made. At the same time, a count of patients (control count) and visits (card count) is obtained if desired.

Report. For a periodic summary enumeration, one goes to each set of duplicates consecutively from main number 001 forward, and in each group, first sorts on column 3 of diagnostic field 1 to obtain the x cards (those to be reported). The selected cards are then ordered on patient case number, and are run through the tabulator for a "controlled" count (to obtain a count of each patient only once). The main numbers which represent the rubrics used for summary report purposes and totals are printed on the tabulator print sheet consecutively, so that this sheet need merely be copied to give the final summary report.

SUMMARY OF PROCEDURES

1. On registration of a patient, a blank master card is filled in with name and patient number and placed in a file, awaiting the dismissal of the patient. This is merely a check to prevent the missing of histories.

2. After dismissal of patient, the history of the case is sent to the indexing department, where the previously prepared master card (see 1) is removed from the waiting file. On this card, a clerk copies in appropriate spaces the diagnoses and operations; and then codes these on the same card from an alphabetically arranged code book (Figure I).

3. History and master card go to a second clerk who independently checks the coding.

4. The master card is taken up by a punch clerk who punches from the summary sheet of the history, general data (columns 1 through 20). The coding of the diagnoses and operation (see 2) on the card in the punch machine is now visible to the punch clerk, and from these the punching is completed (columns 21 through 65). The number of diagnostic fields occupied is also punched (column 19).

5. The history and master card pass to a checking clerk who independently punches the first duplicate from the notes on history and the coding on the master card. The card is light-checked by this clerk with the original master card. This step is included as a check on punching. These two cards later are checked again for punching, by running them through the checking device of the reproducing machine.

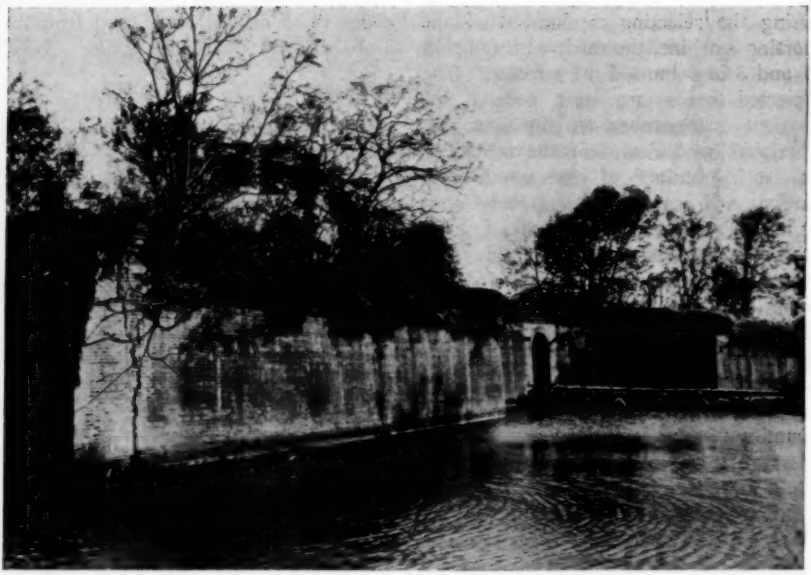
6. The accumulated first duplicates are sorted on the previously punched number of duplicates (column 19) into groups requiring 2, 3, 4, 5, 6 duplicates. Each of these is run through the

* In sorting the duplicates, I have arranged to sort with them a specially prepared tab punch card with the number printed on the tab so that the duplicates after ordering are conveniently separated by these marked tabs and easily filed.

duplicating machine the required number of times. For the cards having six diagnoses, for instance, the second duplicate makes the third; the third, the fourth; and so forth, until the sixth is complete.

7. The master cards are sorted on patient case number and then filed.

8. The duplicates are sorted with inserted tab punch cards on the main number of the first diagnostic field (column 20 through 22). This groups them in main number order and they are so filed.



Old Fort Macomb, formerly Fort Woods—Located on the Old Spanish Trail 22 miles east of New Orleans at Chef Menteur. Built in 1842 on land which was formerly the property of the King of France. This great mass of embattled brick with all the typical accoutrements of an ancient stronghold of war, with turrets and moats and drawbridges, is one of a considerable number of old forts to be found in the vicinity of New Orleans.

Industrial Sanitation as a Public Health Engineering Activity*

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THE Committee on Industrial Hygiene of the Conference of State Sanitary Engineers in 1932 canvassed their membership to learn the status of work in industrial hygiene done by the various states. From the data condensed into their report [1] and from subsequent inquiries it is evident that the engineering branch of industrial hygiene, which we are calling industrial sanitation, could almost be appropriately described as a public health engineering inactivity. "Industrial sanitation" is intended to mean primarily the measurement and control of environmental conditions of atmosphere, illumination, and protection against toxic or devitalizing exposures, and not primarily the sanitary engineering specialties of water supply and disposal of wastes as applied to industry.

Connecticut has perhaps the only state department of health in which industrial sanitation is beginning to be at all adequate. *Public Health Bulletin 184* (1932) [2] gave the appropriations for the 4 states having separate bureaus or divisions of industrial hygiene. At that time the Connecticut bureau had an appropriation twice as great as that for any of the other 3 states, and it has since made an addition to the personnel working at industrial sanitation. Its growth to meet a demand justifies the department's article [3] on the necessity for the bureau.

Industrial sanitation is to some extent an activity of a few state departments of health not having special bureaus. Certain large cities are beginning to carry out programs, as may be learned, for example, from the publications of the Baltimore Department of Health. Departments of labor in a few states have divisions devoted to industrial sanitation, and individual industries have made noteworthy progress.

Nevertheless, widespread application of the technical knowledge of industrial sanitation which has been amassed in quite recent years has lagged. No great elaboration is required to convince members of this organization that its application is needed, but should they desire to present the case to others, a few additional references may prove valuable.

Dr. Jirka [4] has summarized the scope of the problem, and statistics showing the need of control measures, including the appalling statement that workers, because of industrial hazards, have 5 years cut from their average life span as compared with those of similar economic status employed in non-hazardous occupations.

Bloomfield and Johnson [5] conclude from a study of a typical industrial area that a constructive program of industrial hygiene should be established in the department of health.

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* Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 10, 1935.

The 615 plants surveyed showed exposure to 39 different materials and conditions which involved possible systemic poisoning. Inorganic dusts, carbon monoxide, and lead were the most important hazards, all of which are amenable to engineering attack.

These are recent examples from a growing body of literature confirming the need of the work. Why has this need not been met?

That appropriations have been inadequate is not a full answer. It remains not only for pioneers to demonstrate that appropriations are justifiable before the movement can spread on a broad front, but also for a number of departments to take it up successively and show that the program is generally applicable. At present this appears to be progressing slowly.

In some cases appropriations can be obtained when it is shown from experience elsewhere that the need exists and that means are available for meeting the need with real accomplishment. In other cases it is incumbent upon health departments to make a start and demonstrate what can be done with existing appropriations and by existing divisions.

Whether appropriations are to be sought, or a program, however modest, is to be initiated to demonstrate the possibilities, it is the province of the public health engineers attached to the departments to advance the movement. Industrial sanitation is so peculiarly an engineering problem that its widespread advancement has lagged for want of engineering initiative, because the medical direction of the engineering aspects of industrial hygiene cannot be advanced without engineering assistance.

This brings us to the point of this paper, namely, that progress has been retarded because public health engineers have been too preoccupied with sanitary public works projects during an abnormal period of readjustment to have been able to keep up with the advancing knowledge of industrial sanitation in its scattered and largely undigested form. This is especially true in departments where the only public health engineers are sanitary engineers not grounded in industrial sanitation, lighting, ventilation, etc., as recommended by the Committee on Qualifications of the Conference of State and Territorial Health Officers.[6]

It is to these latter engineers that this paper is particularly addressed, for we hope to show how sanitary engineers may extend their work to include industrial sanitation. The nature of their fundamental training and experience fits them for such work; it is only a matter of application of new variations of old principles.

While these variations are numerous in the multiplicity of hazards encountered, the majority fall within a few groups. This makes it possible for a few sets of apparatus and procedures for sampling and determinations to cover a large proportion of the problems in practice, and possible for a relatively small variety of remedies to reduce most hazards.

Taking the typical industrial area mentioned, where inorganic dusts, carbon monoxide, and lead were the most important hazards, the attack would be started by the usual qualitative inspections, followed by such determinations of concentrations of these contaminants in the workroom atmospheres as appeared desirable.

The Greenburg-Smith impinger would serve to sample either the dust or the lead. If this sounds unfamiliar to the sanitary engineer, let us say that the determination for lead consists of the blowing of a measured quantity of lead laden air through water against a surface and analyzing the water.*

* An analysis for lead developed by Howard[5] in New Hampshire, due to simplicity of manipulation, is more fool-proof than the standard methods.

It would not take long to train someone to make determinations for dust or lead, nor to do the sampling and determination for carbon monoxide. The greatest hurdle for the sanitary engineer has been taken when he has obtained a list of apparatus needed and a working outline of standard procedure. We will come to the selection of these definite items from the maze of literature.

Next, where the fairly definite standards established for maximum allowable concentrations of these substances are exceeded, the correction demands that the public health engineer outline to the manufacturer what is practicable. In some cases manufacturing processes can be modified to suppress generation of an excess of the contaminant; for example, dust may be wet down as it forms, or hoods may be installed to collect it before it diffuses into the air. Improvement of general ventilation may be indicated, and much may be accomplished by good "housekeeping." Uncontrollable contamination may demand as a last resort that respirators be worn.

The control or modification of the process, the collection and exhaust of the contaminant, the improvement of ventilation or "housekeeping," and the determination whether the respirator is effective involve the same principles that sanitary engineers apply to the treatment of water and wastes.

Industrial hygienists might at this point notice an incompleteness. But we are confining our exemplification to industrial sanitation, stopping where it begins to overlap the phases which belong under immediate medical direction.

Full fledged experts in industrial sanitation should be attached to departments of health, but until they are procurable, we believe that public health engineers in most departments should, and could, initiate and carry out programs, notwithstanding the fact that such extension involves the work of years rather than of months, and that an approach without a full course of special training demands that branches of the work be mastered and applied one by one.

During the present plastic stage of the art, certain aids would be of immense assistance to public health engineers. Visits by experts of the U. S. Public Health Service for the express purpose of instruction in programs and technic would be invaluable. Intensive courses in industrial sanitation planned like the 2 weeks' courses given to health department personnel at the U. S. Public Health Service Stream Pollution Station in Cincinnati are needed. If such courses were confined to procedures which have proved practicable, omitting alternative methods, methods infrequently encountered, and general instruction in non-engineering phases of industrial hygiene or its administration which could be read up at leisure, engineers receiving the instruction could be equipped to undertake a considerable variety of original investigations.

We would also suggest that a committee of this Association might be appointed to compile a manual of industrial health engineering practice as was done for water works by the American Water Works Association, and this is something that need not necessarily be delayed for want of means of financing.

If selected contributors could be recruited among technicians of bureaus of industrial hygiene, industrial hygienists of insurance companies, industrial chemists, research workers, and faculties of schools of public health, etc., it should be possible to assemble an eminently practical manual from knowledge already available, despite the fact that much of the so-called "engineering" practice has yet to be put on a scientific basis, as is instruc-

tively shown by Hatch [8] in the case of dust control. The manual could be confined to practical working information on industrial sanitation, could omit other aspects of industrial hygiene, and could exclude, but refer to, material already in accessible form in a few publications which those using the manual would be expected to own. By so confining its bulk, the task should not prove too formidable. One publication in particular, the 2,300 page *Encyclopaedia of Hygiene, Pathology and Social Welfare,* should be in the possession of industrial sanitarians, and on the assumption that those going into the subject seriously would obtain it, the bulk of our manual could be kept down by avoiding repetition of its contents. Turner [9] declares this encyclopedia of industrial hygiene to be the most complete and reliable reference work of its type. But it does not preclude the necessity of a practical working manual.

Among the few other publications that such a manual might refer to rather than repeat may be mentioned the bulletin *Determination and Control of Industrial Dust,* by Bloomfield and Dallavalle.[10] There is no reason for such a manual to duplicate the contents of a standard textbook, and we understand that the first one on dust is under preparation by Drinker and Hatch, of the Harvard School of Public Health.

Such a manual could fulfil the lack of assembled information in giving working directions for analytical determinations of concentrations of various substances in air, with diagrams of apparatus, methods of calibration, tabulations of threshold concentrations, substitutes for hazardous substances and for what processes their use is practicable, known modifications that could be applied to unsatisfactory processes, design data on actual installations for exhaust and ventilation systems and their performances, data on actual practice in progressive industries where hazards are guarded against, etc. A fund of unpublished information could doubtless be ferreted out by a coöperative effort among a well selected group of contributors.

We agree with the opinion of Cook [11] that no one has prepared a treatise on industrial health engineering because it would grow obsolete faster than an individual could prepare it. Therefore, a condensed manual prepared by a committee appears to be the logical solution.

Public health engineers have the choice of attending to the development of industrial sanitation or seeing this work established by engineers in departments of labor. For instance, the Division of Occupational Hygiene of the Massachusetts Department of Labor and Industries was recently created, as described before the section on occupational diseases at the Massachusetts Safety Conference [12] in 1935.

This trend represents a good development through the wrong channels. Engineers developing industrial sanitation in departments of labor have not the medical, technical, and laboratory facilities to support them that are available in departments of health. Industrial sanitation aims to elevate health and is a natural part of the public health organization of the country. Its objectives should come under constant medical scrutiny without which it can have no intelligent objectives. The work should be evaluated under medical supervision in order that its cost may be apportioned properly in relation to other public health activities. To disjoin an important branch of technical work from a public health organization detracts from the strength and value of that organization and offers no compensating advantage. The position of state departments of health between federal, on the one hand, and county, municipal, and local departments of

health on the other, together with their accustomed coöperation in all aspects of health control, makes the department of health the logical organization to supervise this work in the interests of efficiency.

While industrial sanitation is a tool of preventive medicine and should be so organized, we believe there is a strong reason why engineers should head divisions prosecuting this work under departments of health in coöperation with medical experts in industrial hygiene rather than as subordinates to them. The reason is simply that its importance and difficulty demand able engineers, and you will not, in the long run, find many engineers of outstanding ability in subordinate positions in departments of health, if competition for leadership is denied them.

This paper could have come to a logical end on this note had we not already sent the Association an abstract stating that two other items were discussed: (1) The expansion of sanitary engineering activities in an industrial state to include industrial sanitation as a forerunner to the creation of a separate bureau; and (2) Legislation which was introduced to establish an adequate industrial inspection service jointly by the Rhode Island Departments of Labor and of Public Health.

Our activities are proceeding along lines advocated herein. While it has been impossible as yet to carry out an adequate program, we have done a considerable variety of work in industrial sanitation in the past 3 years, and have come to be called upon so frequently that if legislation is not obtained soon to establish the work on a recognized footing it will have been established by precedent.

This was made possible by the addition in 1931 of a second assistant sanitary engineer to our personnel and by other sympathetic and material assistance by those in a position to dispense such things.* Our ability to attack such problems as arise has been dependent in no small degree upon the advice available from the Harvard School of Public Health, the Connecticut Bureau of Occupational Diseases, the U. S. Public Health Service, and the National Safety Council.

Finally, as to our legislation—Acting under authorization of the Director of Public Health, legislation was prepared in coöperation with our legally trained Director of Labor and introduced before the close of our last session.

It was aimed to create a bureau in the Department of Public Health with a nucleus of trained personnel and enlarged laboratory facilities, which would devote full time to industrial sanitation. Conjointly it was aimed to create a bureau in the Department of Labor with a nucleus of trained personnel who would coöperate with the Department of Public Health, have access to their laboratory facilities, and who would exert a technical educational influence on the non-engineering portion of the inspectional staff of the Department of Labor. It was specified that the data or reports of the bureau in the Department of Public Health could not be used in court, since it was desired to keep this bureau on a solely advisory basis, which, as attested by Gray,[12] is of great importance if the full coöperation of manufacturers is to be had. At the same time, it would be understood by manufacturers that bad conditions might be referred to the Department of Labor for the obtaining of evidence to be used in the enforcement of laws. This attempt to provide both the benefits of a bureau confined to advisory service and an enforcement agency which would be able to obtain

* The Rockefeller Foundation provided a fellowship covering attendance at the courses in industrial hygiene given by the Harvard School of Public Health.

the technical evidence needed departs from the precedents offered by the two states adjacent to Rhode Island.

We expect to continue the expansion of activities in industrial sanitation and are hopeful of successful action on the legislation this winter. Passage of such legislation has been recommended by our Governor.

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NOTE: The numbered references given have been selected so as to include recent and available matter which, with the obvious exception of the encyclopedia, could be read to advantage by engineers who may extend the efforts of their divisions into industrial sanitation but who have not hitherto familiarized themselves with the subject.

There is as yet no textbook in the form of a treatise on industrial sanitation, but in Rosenau's *Preventive Medicine and Hygiene,* 6th edition, New York, 1935, two sections form an admirable brief text, Section VII on Air, and Section XIV on Industrial Hygiene and Diseases of Occupation.

For a description of practical application, see the annual reports of the Bureau of Occupational Diseases of the Connecticut State Department of Health since 1927, or, for its administration, see "The Administration of Occupational Disease Control," by Albert S. Gray, M.D., *Safety Engineering,* Vol. 68, p. 251 (Dec.), 1934, and Vol. 69 (Jan.), 1935.

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For an outline and forms for surveys see "Preliminary Surveys of the Industrial Environment," by J. J. Bloomfield, in *Public Health Reports,* Vol. 48, No. 44, p. 1343 (Nov. 3), 1933.

Cultural Methods of Isolation of Tubercle Bacilli*

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IN a previous report[1] we outlined the results obtained in a comparative study of cultural and animal inoculation tests carried out on 343 specimens of sputum. As the cultural examination was found to be more sensitive, and as it is free from disadvantage of test animals dying from intercurrent infection, we decided to extend our cultural study to all specimens received upon which an animal test was requested. The routine followed was a cultural examination on sputum specimens and a cultural and animal inoculation test on all specimens of pleural fluid, ascitic fluid, joint fluid, and glandular material.

METHOD OF PROCEDURE

Pure cultures of *M. tuberculosis* can be isolated or obtained directly from tuberculous material, if the tubercle bacilli are present in sufficient numbers and mixed infections are not present, by using the proper blood serum or egg culture medium. If organisms other than tubercle bacilli are present, and as these organisms grow more rapidly than tubercle bacilli, the specimen must be treated preparatory to culture.

METHOD OF TREATMENT

Several methods of treating specimens have been tried in the Ontario Department of Health Laboratories. We have found the low grade acid treatment for 2 hours, with subsequent neutralization by the addition of 3 per cent sodium hydroxide solution, to be the most satisfactory method tried to date. The procedure briefly is as follows:

1. The specimen when received is placed in a sterile 6 inch test tube, care being taken to deliver it to the bottom of the tube. Every precaution should be used to prevent as far as possible contaminating the side of the tube. The neck of the tube is well flamed and a sterile cotton plug is inserted.

2. Equal parts of 3 per cent hydrochloric acid containing bromcresol indicator is added to the specimen. Should there only be a sedimented specimen, 5 c.c. of this reagent is added. This acid solution is 3 per cent of the concentrated hydrochloric acid, and is not 3 per cent hydrogen chloride.

3. After the addition of the 3 per cent hydrochloric acid solution to the specimen, the tube is shaken by a side to side motion, and the upper portion of the tube is well flamed to within an inch of the upper level of the liquid. A fresh sterile cotton plug is inserted in the tube.

4. The specimen is left at room temperature for 2 hours, after which time it is neutralized by the addition of 3 per cent sodium hydroxide (pH 7.0). This reagent is added aseptically in the tube.

5. A rubber cap is placed over the tube in order that the cotton plug will be held in place. The neutralized specimens are then centrifuged at high speed for ½ hour.

6. After centrifugation, the supernatant fluid to within ½ inch of the sediment is withdrawn by means of a suction apparatus, which is attached to a rubber tubing on a flask containing phenol 5 per cent.

7. By means of a platinum loop, a beef infusion broth culture is planted with a loop-

* Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

TABLE I

NUMBER AND PERCENTAGE POSITIVE ON PETRAGNANI'S, PETROFF'S AND WOOLLEY'S MEDIA, SERIES NO. I

	Pgn. Pet. Wol.	*Pgn. Pet. Only*	*Pet. Wol. Only*	*Pgn. Wol.*	*Pgn. Only*	*Pet. Only*	*Wol. Only*	*Totals*
Sputa	2	9			3	2	1	17
Urines	8	23	2	3	5	2		43
Right and Left Ureter		2			2	1		5
Pleural Fluids	10	13			4	1		28
Joint Fluids	3	2						5
Pus	5	15		3	3	3		29
Miscellaneous	2	1						3
Totals	30	65	2	6	17	9	1	130
Percentage positive on each medium	23.0	50.0	1.5	4.6	13.0	7.0	0.9	100

Pgn. = Petragnani's — Petragnani's positive on 90.6% of the specimens.
Pet. = Petroff's — Petroff's " " 81.5% " " "
Wol. = Woolley's — Woolley's " " 30.0% " " "

TABLE II

NUMBER OF SPECIMENS EXAMINED IN SERIES NO. I

	Total No. of Specimens	*No. of Positives at 4 Weeks*	*No. of Positives at 8 Weeks*	*Total*	*No. of Negatives*	*Percentage of Positives*
Sputa	683	17	13	30	653	4.39
Urines	523	45	15	60	463	11.47
Right and Left Ureter	179	8	3	11	168	6.14
Pleural Fluids	206	32	10	42	164	20.38
Joint Fluids	54	8	2	10	44	18.52
Pus	108	32	12	44	64	40.74
Miscellaneous	73	4	0	4	69	5.48
	1,826	146	55	201	1,625	11.00

TABLE III

SPECIMENS ON WHICH CULTURE WAS CONTROLLED BY GUINEA PIG INOCULATION IN SERIES NO. I

	Total Number	*Guinea Pigs*		*Cultures*	
		Negative	*Positive*	*Negative*	*Positive*
Right Ureter	90	85	5	83	7
Left Ureter	89	84	5	85	4
Urine	139	125	14	120	19
Pleural Fluid	136	114	22	106	30
Sputum	9	7	2	8	1
Pus	81	53	28	48	33
Joint Fluids	49	39	10	40	9
Miscellaneous	49	47	2	47	2
	642	554	88	537	105

TABLE IV

SPECIMENS ON WHICH CULTURE WAS POSITIVE AND GUINEA PIG INOCULATION NEGATIVE, OR VICE VERSA

Type of Specimen	*Culture Positive Guinea Pig Negative*	*Culture Negative Guinea Pig Positive*
Right Ureter	1	0
Left Ureter	1	2
Urine	10	0
Pleural Fluid	9	2
Sputum	0	1
Pus	6	2
Joint Fluids	1	2
Miscellaneous	0	0
	28	9

ful of material from each specimen. These broth cultures are incubated at 37° C. for 24 hours, and then examined for turbidity in the liquid. These broth cultures indicate whether or not all extraneous organisms have been destroyed in the treatment process.

8. All the specimens showing no growth on the broth are then planted by a sterile capillary pipette on various types of media suitable for the primary growth of tubercle bacilli.

CULTURAL PROCEDURE

In our first series, a platinum loop was used in seeding. At least 3 or 4 loopfuls were placed on each slant. In the second series, a capillary pipette was used. At least 3 drops of the treated sediment are placed in each tube. After seeding, the upper portion of the culture tube is flamed, the cotton plug ignited, and inserted in the tube. A rubber cap, boiled for 15 minutes, is placed over the end of the tube. The specimens are incubated at 37° C. for 8 weeks. The cultures are examined after 4 weeks. Cultures showing visible growth are examined, smears prepared, examined, and reported. Others are incubated for a further 4 weeks.

TABLE V

TUBERCULOSIS CULTURES

NUMBER OF SPECIMENS POSITIVE AT 4 AND 8 WEEKS AND THE TOTAL PERCENTAGE OF POSITIVES ON VARIOUS TYPES OF SPECIMENS

	Total Number of Specimens	*Number of Positives*		*Total Positive*	*Number Negative*	*Percentage of Positives*
		at 4 Weeks	*at 8 Weeks*			
Sputa	1,101	41	18	59	1,042	5.35
Urines	604	48	12	60	544	9.93
Right Ureter	114	11	2	13	101	11.40
Left Ureter	101	2	4	6	95	5.94
Pleural Fluid	187	25	7	32	155	17.11
Bone and Joint Fluid	50	9	4	13	37	26.00
Pus	96	27	7	34	62	35.41
Miscellaneous	76	1	3	4	72	5.26
	2,329	164	57	221	2,108	
Percentage Positive		74.2	25.8			9.49

Guinea Pigs Positive, Culture Negative 17, Total Positive 238, Total Per Cent Positive 10.2

TABLE VI

TUBERCULOSIS CULTURES

NUMBER AND PERCENTAGE POSITIVE ON PETRAGNANI'S, LOWENSTEIN'S, WOOLLEY'S AND LOWENSTEIN'S SILICA MEDIA

	Pgn. Lwn. Wol. L.S.	*Pgn. Lwn. Wol.*	*Pgn. Wol. L.S.*	*Pgn. Lwn. L.S.*	*Lwn. Wol. L.S.*	*Pgn. Lwn.*	*Pgn. Wol.*	*Pgn. L.S.*	*Lwn. Wol.*	*Lwn. L.S.*	*Wol. L.S.*	*Pgn.*	*Lwn.*	*Wol.*	*Lwn.-S.*	*Totals*
Sputa	25	2	2	3	5		2	2			1	3	6	5	3	59
Urines	37	5	1	4		2	1	1	1	1		1	4	1	1	60
Right and Left Ureter	8	2		1	1	1	1			1			2	1	1	19
Pleural Fluid	18	1		1	4	2		1	1		1			1	1	32
Bone and Joint	8	2					1						1		1	13
Pus	25	1			1	2	1		1	1			2			34
Miscellaneous	3								1							4
Totals	124	13	3	9	11	7	6	3	4	3	2	4	16	8	7	221
Percentage Positive on each Media	56.1	5.9	1.4	4.2	4.9	3.1	2.8	1.8	1.8	1.4	0.9	1.8	7.2	3.6	3.1	100.0

Petragnani's positive on 170 or 76.9%
Lowenstein's positive on 187 or 84.6%

Lowenstein's Silica positive on 163 or 73.7%
Woolley's positive on 171 or 77.4%

CULTURE MEDIA USED

A number of media have been proposed. In connection with our work, the following media have been used:

1. Lowenstein's
2. Lowenstein's with silica
3. Modified Petroff's
4. Petragnani's
5. Woolley's medium with and without glycerine
6. Feldman's modification Herrold's medium
7. Dorset's
8. Modified Dorset's
9. Lowenstein's and Petragnani's medium to which silica has been added

STUDIES MADE

From October 1, 1932, to June 30, 1933, each specimen was planted on 2 modified Petroff's, 2 Woolley's, and 2 Petragnani's culture tubes. From July 1, 1932, to January 1, 1934, these were supplemented by 2 Lowenstein's, 1 Petragnani's containing 1 per cent sodium silicate, and 2 Woolley's slants without glycerine. Of the media used, Lowenstein's and Petragnani's yielded the greatest number of positives.

Table I shows the number and percentage of positive cultures obtained from each of the 3 types of medium used. Petragnani's media gave the most positives, and Woolley's least. Woolley's media showed a rather high percentage of contaminated tubes. When malachite green is added to this medium, instead of crystal violet, it yields very satisfactory results.

Table II shows the number of specimens examined in Series No. I.

Of 1,826 specimens examined, 201, or 11 per cent, were positive, of which 146 were found positive in 4 weeks, while 55 required 8 weeks' incubation.

Specimens on which culture was controlled by guinea pig inoculation, in Series No. I—Table III shows the results obtained in examining 642 specimens by both the culture and animal inoculation. The cultural test yielded

TABLE VII

TUBERCULOSIS CULTURES

629 SPECIMENS ON WHICH CULTURAL TEST WAS CONTROLLED BY GUINEA PIG INOCULATION

	Total Number	Guinea Pigs		Cultures	
		Negative	Positive	Negative	Positive
Right Ureter	114	101	13	101	13
Left Ureter	101	95	6	95	6
Urine	164	134	30	135	29
Pleural Fluid	79	63	16	64	15
Sputum	1	1	0	1	0
Bone and Joints	43	34	9	33	10
Pus	78	52	26	53	25
Miscellaneous	49	43	6	45	4
	629	523	106	527	102

105 positives, and the animal inoculation 88.

Specimens on which culture was positive and guinea pig inoculation negative, or *vice versa*—Of the 642 specimens included in this comparative study, 28 yielded positive cultural results, while the animal inoculation yielded 9. Animal inoculation yielded positive results in the case of 1 ureter, 1 joint fluid, and 1 sputum, in which cultures were negative.

During 1934, the media used was Lowenstein's, Lowenstein's with silica, Petragnani's and Woolley's with and without glycerine. Feldman's media was tried, and Woolley's media with phosphate buffer. We discontinued the use of modified Petroff's, as it had no advantage over Woolley's and was less efficient than either Lowenstein's or Petragnani's. In addition, a further cultural test was made on 302 specimens, using Lowenstein's, and Dorset's containing sodium silicate.

A second cultural study was made on 226 specimens in which 4 different silicates were added to Petragnani's medium. The result of this work is as follows: During the year 1934, the animal inoculation test was carried out, using a portion of the untreated specimen, while in 1933, the test animals were inoculated with a portion of the treated specimen.

Table V shows the number and

TABLE VIII

ANALYSIS OF COMPARATIVE TESTS

SPECIMENS ON WHICH EITHER CULTURE OR GUINEA PIG WAS POSITIVE

Type of Specimen	Culture Positive Guinea Pig Negative	Culture Negative Guinea Pig Positive
Right Ureter	4	4
Left Ureter	0	0
Urine	2	3
Pleural Fluid	1	2
Sputum	0	0
Pus	2	3
Joints and Bone	4	3
Miscellaneous	0	2
	13	17

nature of specimens examined during 1934. Of 2,329 specimens cultured 9.49 per cent were positive, of which 74.2 per cent were found positive in 4 weeks, and 25.8 per cent after 8 weeks.

Table VI shows the results obtained in using Petragnani's, Lowenstein's, Lowenstein's silica, and Woolley's medium.

Table VII outlines the results from 629 specimens cultured and inoculated.

Table VIII shows that in Series No. 2 cultures were positive in 13 instances in which animal inoculations were negative, while animal inoculations were positive in 17 instances in which the cultures were negative.

SUMMARY

Cultural examination for the primary isolation of tubercle bacilli was carried out in 2 series, which include all the routine specimens received at the Central Laboratory, Ontario Department of Health, during 1933 and 1934.

For 1,826 specimens, Petragnani's, modified Petroff's, and Woolley's media were used routinely. Dorset's and modified Dorset's media were tried, but found inferior, and their use was discontinued. Of the 3 media used, Petragnani's yielded the greatest number of positive results (Table I). On 642 specimens, the cultural examination was controlled by animal inoculation. Cultures were obtained from 105 specimens, while 88 produced typical tuberculosis in animals, inoculated with 1.5 c.c. of the treated sediment.

For 2,329 specimens, Lowenstein's medium with and without sodium silicate, Petragnani's and Woolley's medium with and without glycerine, were used throughout the series. Feldman's medium was tried, but was not as satisfactory as the others, and was discontinued. Of the media, Lowenstein's gave the most positives (Table VI), of which 74.2 per cent were visible in 4 weeks.

In a further comparative study of cultures and animal inoculations on 629 specimens, the animals gave positive results for 4 more specimens than the cultures. The animals were inoculated with 1.5 c.c. of the untreated specimen.

CONCLUSIONS

1. Cultural examination for the primary isolation of tubercle bacilli has been found to be equally as sensitive as the animal inoculation test.

2. The cultural examination is free from the disadvantage of test animals dying from intercurrent infections. In 77.2 per cent of the positives a report was available in 4 weeks.

3. Our results indicate that on specimens other than sputa and chest fluids, both a cultural and animal inoculation test should be carried out.

4. The results obtained indicate that further studies on suitable cultural media and animal inoculation tests should be carried out.

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Integration of the School Health Program with Community Health Education*

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ONE of the most significant changes that have become evident because of the economic upheaval in recent years is the interest which the community has taken in the public school system. This interest has not always been completely altruistic, but it has caused the schools to take inventory, criticise their curricula, and analyze their programs in the light of their contributions to the community.

Has the school health program of the past been integrated with community health education? Before attempting to answer that question and before venturing any suggestions as to present or future integration there should be a clear understanding as to what constitutes a school health program and how we are to define community health education.

Any successful school health program must concern itself with three distinct factors: (1) healthful school living, (2) health service, and (3) health instruction. Furthermore the content of the program must be adapted to the age level of the child, that is, whether he be in the elementary, junior high, or senior high school. There are some differences of opinion among school people as to just what should constitute the specific programs on these three different levels. The ones cited here seem to be meaningful and in accord with present-day educational concepts.

Health work in the elementary schools should consist of a program built around the child's everyday school experiences. It should aim toward the inculcation of health attitudes and health habits with as much actual health teaching as is consistent with the elementary school child's ability to absorb it.

The junior high school program may combine some of the work on the elementary level with one period a week devoted to definite health instruction as outlined by a course of study supplemented with textbooks.

Presupposing that such a program as briefly outlined is operative in the elementary and junior high school, the senior high school student should be given an opportunity to appraise his own health needs and be given guidance and help in meeting them.

What aspects of such a school program as this may be carried over into the community, and how may the community supplement such a program with its health education program? Again to answer this there must be a clear understanding of what constitutes com-

* Read at a Joint Session of the American Association of School Physicians and the Public Health Education and Public Health Nursing Sections of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 10, 1935.

munity health. Community health consists of the coöperation of the citizens in the community; a safe milk supply; an adequate pure water supply; careful food inspection; sanitary disposal of city waste, garbage, and sewage; protection against communicable diseases; mental hygiene; and lastly but increasingly imperative, education in health.

Too little emphasis has been placed on education in health, both in our schools and in the community. Too much emphasis has been placed on health service in our schools with the result that boys and girls have been graduated from high schools totally ignorant of how to meet their health problems as they arise. The home, the most vital place in the welfare of the community, has waited for the child to go to school to get a health check-up. The school has examined the child, made some spasmodic and sporadic attempts at following up defects, and then has set him loose on the community to duplicate later the mistakes of his mother and father.

It is one of the jobs of the school to see that boys and girls are thoroughly familiar with community health problems before they are graduated from high school. Furthermore, they must be instructed as to how they are to meet their own health needs. This entails familiarizing them with hospitalization, *i.e.*, what hospitals are available, their location, and their particular functions; with clinics and their particular function in the community; and with the medical profession and its societies. This last is of particular importance. Some communities are taking definite steps along this line through written communications, from the local medical society, the board of education, and the board of health jointly, to parents urging them to take their children to their private physician for a physical examination before the opening of school. Remarkable results have been attained in some schools through such a program. As high as an 80 per cent response has been achieved. Such an attempt as this serves the triple purpose of educating the parent as to the health needs of the child, of familiarizing the child with ways of securing health service, and of acquainting the physician with some of the health problems confronted in schools. As this plan becomes perfected, more time may be devoted by the school physician in individual check-ups and less to wholesale physical examinations.

The physician may also be brought more closely into sympathy with the school program of health and physical education by asking him to specify what of certain health and physical education activities a child may indulge in, rather than issuing a blanket excuse from all phases of the program. A modern curriculum of health and physical education includes opportunity for participation in (1) rest, (2) walking classes, (3) light work in the gymnasium, (4) corrective work, (5) regular gymnasium work, (6) athletics, (7) swimming, and (8) health instruction. Surely if a child is able to come to school at all he can take part in some phase of this program. It is the duty of the school to acquaint the physician in the community with the fact that the physical training and physical culture classes that tortured him have been replaced with a comprehensive program of games, athletics, stunts, swimming, and dancing, as indicated. The time has passed when the private physician merely sends a note to the school in his community which says, "Excuse Mary Jones from gym." It is only through the close coöperation of the agencies just mentioned, namely, the local medical society, the board of health, and the board of education, that such integration between the home,

school, and physician may be achieved.

Boards of health are recognizing more and more the crying need for further health education of the community. It has been a slow process through the era of sanitation of the environment and the era of bacteriology to the individual, just as it has been a slow process for boards of education to recognize that there are individual differences among children and that these must be considered not only from the academic standpoint but also from the standpoint of his social, emotional, and physical health.

Some of the media employed by boards of health in their community health education program include the radio, the press, health contests, exhibits, special campaigns, billboards, parent teacher associations, the schools, local service clubs, etc.

There is a definite integration of the school health program with several of these. The radio is an outstanding example. In Detroit there are weekly broadcasts on pertinent health matters. Many of our schools are equipped with radios. Health instruction classes meeting at the hour when these programs are being broadcast tune in on them. The messages are thus going both into the home and into the school.

One of the projects instituted in health instruction classes in the schools consists of analyzing and evaluating health material found in magazines and newspapers. Material in the latter in particular deals largely with local community health problems. Free discussion of these problems develops a worth while community consciousness.

Nutrition classes and home nursing classes have been organized in many schools under the supervision of the board of health. These classes meet a very definite community need particularly in certain socio-economic centers where there are many large indigent families. The older sister brings many healthful changes into the home that would otherwise not have been made. Nutrition classes have of course been particularly valuable during the depression.

Little need be said about parent-teacher associations. This is a fertile field for integration of school and community health and it has been well used although much more might be done.

There are many other agencies, governmental, voluntary, or business, which are leading the way in health education of the community and are also supplying valuable material for the school health program. It is only necessary to mention a few of them to call to mind their significant contributions: The U. S. Public Health Service, state and city departments of health, Visiting Nurse Associations, juvenile courts, National Red Cross, American Social Hygiene, National Health Council, American Physical Education Association; various foundations such as the Commonwealth Fund, the Kellogg Foundation; and various business organizations including the National Dairy and Food Council, life insurance companies, etc.

Special consideration should be given to the work of the National Safety Council and its local branches since accidents have become of such vital concern to every community. This is an outstanding example of the extent to which integration between school and community may go when each is aroused to the seriousness of a situation. Here we find police departments, the American Legion, chambers of commerce, and local service clubs working in close harmony with school authorities in decreasing the incidence of accidents. All of these agencies are endeavoring to educate the public in accident prevention. The results of their coöperation with the schools in an educational pro-

gram to prevent accidents, particularly vehicular ones, are seen in the steady decrease of child injuries and fatalities. Were we to attain an integration of the school health program and community health education equal to that attained between safety education in the schools and the community safety program we would see a tremendous change in the health of our entire citizenry. It is not beyond attainment and, to recapitulate, the experiences of the last 5 years have brought about changes that have stirred all of us out of our lethargy.

Terminal Disinfections

FIVE full years have now elapsed since routine steam disinfection was discontinued, and the following table shows in summary form the results of the last 5 years compared with those of the 5 years immediately preceding. In the table the results of 5 years (1925–1929), during which steam disinfection had been carried out, can be compared with those of 5 years (1930–1934) during which it had been abandoned. The table shows at a glance the total number and also the percentage of secondary cases occurring in premises from which the original cases had been removed previously. By way of explanation, it should be pointed out that, in the final comparison, secondary cases occurring within a week of the primary case have been excluded, the reason being that such cases occurring within the known incubation stage of the two diseases may have been infected by the primary case before removal to hospital.

Period	*Steam Disinfection*	*Disease*	*Cases Notified*	*Cases Removed*	*Secondary Cases After 7th Day*	*Percentage of Secondary Cases*
1925/6/7/8/9	Practised	S.F.	2,054	1,315	80	6.08
		Diph.	1,538	1,272	59	4.63
		Total	3,592	2,587	139	5.37
1930/1/2/3/4	Abandoned	S.F.	2,542	1,683	104	5.51
		Diph.	1,050	896	33	3.68
		Total	3,592	2,579	137	5.31

It will be seen that, in the case of scarlet fever, the percentage of secondary cases has dropped from 6.08 per cent to 5.51 per cent, whereas the relative figure for diphtheria has fallen from 4.63 per cent to 3.68 per cent during the two periods under review. When comparison is made between the total figures (including both scarlet fever and diphtheria) it will be seen that the percentage of secondary cases has diminished from 5.37 (with steam disinfection) to 5.31 (without steam disinfection).—*Andrew W. Forrest, Leyton—Pub. Health,* Mar., 1935, p. 239.

Preliminary Report of the Sub-Committee on Educational Qualifications of Public Health Engineers*†

SCOPE OF PUBLIC HEALTH ENGINEERING

THE field for engineers in public health work has been restricted largely to state health departments with a few openings in city, county, or district health departments. In general, the technical education of public health engineers thus employed has been in sanitary engineering, or in civil or chemical engineering, with courses in general sanitation. These courses have been confined primarily to the subjects of water and sewage treatment and industrial waste disposal with the necessary chemical and biological instruction.

Formerly, and in some states still, engineers with state health departments dealt principally with problems of water, sewage, and industrial wastes. While still an important work of state health departments, these are now only one branch of engineering activity; as for the engineer of the city or county health department, these may be of minor consideration.

At present a few schools offer courses in the subject but, generally speaking, engineers have found it necessary to obtain a considerable part of their public health education through experience. This condition will probably continue until public health administrators exact an adequate degree of graduate education comparable with the responsibility of positions to be filled.

At present the outlook appears favorable for the development of the well rounded health organization, both state and local, with properly qualified personnel. In such departments there is a rather broad field for the engineer qualified to do public health work.

A study of the activities of a well rounded health department shows that environmental sanitation in its broadest sense constitutes a considerable part of the work of the department. In administering this important but non-medical work, basic engineering knowledge and some knowledge of a variety of other professional and technical branches would appear essential. To administer properly the various public health engineering activities, and to assist and advise the health officer in matters where both medical and non-medical knowledge is necessary, requires graduate education.

Briefly, some of the activities now being carried on by engineers connected with health agencies, or activities that by their nature would appear most logically to fall under the administration of one having proper public health engineering education, are as follows:

1. The group of activities having to do with water, water supply and treatment, sewerage and sewage disposal, industrial

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* Committee on Professional Education, American Public Health Association.

† The Committee on Professional Education requested publication of this report to permit the members and Fellows of the American Public Health Association to review it for the purpose of offering criticisms and suggestions to the committee in the further consideration of the reports.

wastes disposal and stream pollution correction will naturally come first. These activities require a knowledge of engineering and such collateral subjects as chemistry, bacteriology, and water biology.

2. The sanitation of rural and recreational areas, including camps, swimming pools and bathing places, schools and public places.

3. The collection and disposal of municipal wastes, while not generally classed as an activity of a health department, always require the attention of health authorities, and it is believed that the problems involved in this activity can best be solved by an engineer having a public health viewpoint.

4. Sanitary control of foods, including the production, pasteurization, and distribution of milk, and the sanitation of the shellfish industry in the coastal states. These varied problems are largely of an engineering nature but also require some knowledge of food technology, chemistry, and biology.

5. Suppression of certain insects capable of transmitting disease occupies a considerable portion of the time of some engineers now with health departments. Rodent control should also be included with insect control activity since both endemic typhus and plague are transmitted through the rat flea. Engineering knowledge and some knowledge of entomology and biology are required in this class of health work.

6. In cities particularly there are many and sundry problems which engage the attention of the engineer of the health department. These include questions of proper city planning, of housing, of heating, lighting and ventilation of buildings, of plumbing, of aerial pollution, and of noise. These problems are largely engineering in character and could best be handled by an engineer with a public health viewpoint.

7. In the epidemiological studies of many diseases, in statistical studies and in the educational program, the engineer should take a considerable part.

8. Obviously the direct supervision of personnel engaged in environmental sanitation should be under the engineer.

Due to the variety of work of an engineer in a health department, it is not reasonable to expect that during an undergraduate course sufficient training can be given to enable him to solve these varied problems. In the future it seems essential that undergraduate instruction be followed, either as it has been in the past, by a period of years devoted to sub-professional and professional work under the supervision of a more experienced engineer, or that provision be made for an additional educational program extending beyond that required for the bachelor degree. It is recognized that most practising public health engineers have acquired this preparation by practical experience. It is also recognized that no educational policy can be formulated that will provide the thorough education that can come through such experience. The public health engineer who has had the opportunity to secure this education by years of experience has a distinct professional advantage over the engineer entering the public health field for the first time. It must be recognized therefore that in the existing field of public health engineering practice there are many engineers who have not had postgraduate education but who are fully qualified through experience to carry on public health engineering activities.

EDUCATIONAL QUALIFICATIONS

The basis of public health engineering education should be engineering. The duties of the committee are to determine what the minimum of education should be beyond that possessed by a graduate of engineering in order that he may enter a health agency as a public health engineer. Even with this education it is obvious that such a young man would necessarily be in a subordinate position, except possibly in a small unit, until such time as he had acquired the necessary experience to permit him to occupy an administrative position.

In many ways the additional education required beyond that included in the usual engineering course is quite similar to that which would be required for a medical man desiring to enter the field of public health as an administrator. The engineer who adopts

public health as a career should have, in general, educational qualifications somewhat comparable to those of a medical man entering this field. In other words, the public health engineer should be first a graduate engineer, and then should have in addition from 1 to 2 years in graduate work which should include the subjects listed below, since not all of these subjects or their equivalent can be covered in the undergraduate work.

While courses in civil or sanitary engineering or optional courses probably offer the best foundation for public health engineering work, the committee would not confine the basic education in engineering necessarily to these courses. Engineering courses with electives in subjects on sanitation appear satisfactory for basic education, provided courses in sanitary bacteriology, sanitary chemistry, and personal hygiene are included.

It is recommended by the sub-committee that, in addition to the subjects normally required for a bachelor's degree in a curriculum outlined above, graduate work should include instruction in:

1. Biostatistics sufficient to give the individual a sound conception of the mass phenomena of disease, familiarity with methods of collecting, recording, and studying statistics on vital phenomena, and ability to interpret the results of the analysis of such material
2. General or theoretical epidemiology, including instruction in the collection, recording, analysis, and interpretation of epidemiological information regarding those diseases toward the prevention and control of which the public health engineer would be expected to contribute
3. General historical background of health administration and a general knowledge of the organization and functions of the national, state, and local health administrative units
4. Fundamentals of common law
5. Sanitary biology and instruction in interpretation of laboratory reports and methods of administration and operation of laboratories in connection with public health work
6. Food technology, with particular reference to production and pasteurization of milk, and familiarity with methods of protection against such diseases as may be transmitted by foods
7. Entomology as it applies to those insects which may be vectors in disease transmission and in methods of this control
8. Housing with respect to health
9. Lighting, ventilation, and plumbing sufficient to give the individual some knowledge of these subjects
10. Industrial sanitation, particularly with reference to certain hazards the correction of which is largely an engineering problem
11. Environmental sanitation as it applies to rural areas and to recreational facilities

Certain subjects above indicated may also be required for health officers. It is believed that instruction in these subjects should be essentially the same for both groups.

Where sufficient instruction in any of the subjects listed has been obtained during the undergraduate course, such subjects need not be repeated.

It is not advisable to attempt to set up any definite schedule of hours of courses, since experience is necessary to determine the proper allotment of time to such courses. This should be left to the educational institutions.

It is considered essential that the experience offered, in lieu of such formal instruction, and also the instruction leading to a position of administrative responsibility, shall be acquired under the technical supervision of experienced public health engineers.

It is the sense of the committee that the title of an engineer who has completed this formal instruction or who has acquired the equivalent through experience should be "Public Health Engineer."

R. E. TARBETT, *Chairman*
A. P. MILLER
J. L. BARRON
EARNEST BOYCE

Preliminary Report of the Sub-Committee on Educational Qualifications of Sanitarians*†

THE duties of this group of health department employees have a wide range, since the carrying out of the environmental sanitation program in all its complexities is its function. These duties can be performed best by one having a technical background, since the problems are largely of a technical nature.

The sanitarian and the public health nurse are the two classes of employees of the health department who come more closely in contact with the general public than any other class of employees. As a consequence, the public judges the efficiency of the health department largely by the work carried on by these two groups.

It seems essential, therefore, that the sanitarian should have sufficient education, including field experience, to permit him to meet the public and to discuss intelligently the work in which he is engaged.

EDUCATIONAL REQUIREMENTS FOR SANITARIANS

Title I

Sanitarian—The committee recommends that the title for one class of employees be "Sanitarian," with such prefix as the training in a particular branch of public health work would indicate. However, when the term "Sanitarian" is used without prefix it should designate a person who has had certain basic instruction in engineering and who later by additional work, may qualify as a public health engineer.

The committee recommends:

1. That the educational requirements be a bachelor's degree from a recognized institution of learning, followed by at least a 1 year course, or its equivalent, in certain subjects necessary for one entering the public health field. Undergraduate work should include science courses, particularly biology and chemistry.

2. The subjects required should be such as to give a general knowledge of health department activities and include some intensive instruction along one or more lines of health work. The intensive instruction might well be grouped under the 3 headings: general sanitation, sanitary control of foods, and control of the environment.

General instruction is recommended in:

1. Biostatistics
2. A general knowledge of epidemiology, including methods of collecting, recording and interpreting epidemiological information regarding those diseases toward the prevention and control of which the sanitarian would be expected to contribute
3. Health administration sufficient to give a general knowledge of the forms and methods of operation of health departments

Special instruction is recommended in:

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* Committee on Professional Education, American Public Health Association.

† The Committee on Professional Education requested publication of this report to permit the members and Fellows of the American Public Health Association to review it for the purpose of offering criticisms and suggestions to the committee in the further consideration of the reports.

1. General sanitation, including nuisances, water supply, sewage disposal, rural and recreational sanitation, mosquito control, and rodent control; or
2. Sanitary control of milk and foods, including laboratory procedures and methods of protection against such diseases as may be transmitted by foods; or
3. Control of the environment, to include housing, plumbing, lighting, ventilation and industrial sanitation.

It is assumed that the undergraduate course would serve as a guide to the individual in the special line of instruction selected for graduate work. Where sufficient instruction in any of the subjects listed has been obtained during the undergraduate course, such subjects need not be repeated.

Title II

Sanitary Officers—It is realized that the employment of personnel not having the educational qualifications above specified will continue until public health administrators are able to require higher standards in this phase of public health work.

During the interim it is recommended:

1. That non-professional employees be given the title of Sanitary Officer;
2. That the educational requirements be not less than graduation from high school and at least 1 year's experience in some line of work that has brought the individual in contact with the general public; and
3. That steps be taken by the health agency to supplement the employee's education in health work by courses equivalent to a 2 year college course; or
4. The completion of a 2 year course in an institution providing a course of instruction in public health prior to employment;
5. That individuals not having had instruction or experience in health work should not have exceeded 35 years of age at time of first employment.

R. E. TARBETT, *Chairman*
A. P. MILLER
J. L. BARRON
EARNEST BOYCE

THROUGH A FRAME OF GRILL
NEW ORLEANS

The Vieux Carre, or Old Quarter, of New Orleans is rich in architectural antiquities. Through the cast iron and hand-embroidered iron work of antebellum slaves can be seen from this Pontalba balcony many colorful vistas of Old New Orleans. The St. Louis Cathedral, built in 1792–1793, is shown in the background.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

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THE SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE

THIS *Journal*, representing one of the oldest health organizations in the world, and the oldest in America, offers congratulations to Thomas Parran, M.D., on his appointment as Surgeon General of the U. S. Public Health Service. It also offers to the Service itself and to the country, congratulations on the wise selection of the President for this most important position. We pledge to Dr. Parran our support and aid in carrying out the duties and responsibilities of his new position.

The appointment fulfils an expectation of several years' standing, during which Dr. Parran has held the important position of Health Commissioner of the State of New York, a position affording abundant opportunity to observe him in action and become familiar with his methods.

Dr. Parran enters on his duties about a year after the passage of the Social Security Act and directly after the appropriation was made which put that Act into effect. For the first time in our history the government has appropriated large sums of money for a national health program designed to be continuous, and which, without taking from the individual states their responsibilities and authority, will lodge in Washington a supervisory service carrying with it financial aid as well as professional counsel. The administration of this Act, although outlined in the creative law, will tax to its utmost the Public Health Service. The law requires that the Surgeon General confer with the State and Territorial Health Officers, and he has accepted the report of a committee of that body and incorporated its conclusions into the administrative regulations. Inasmuch as 16 of his 20 years of service have been in state health departments, Dr. Parran will doubtless endeavor to carry out the sound programs of the state health departments.

The personnel of the U. S. Public Health Service constitutes a large and exceptionally well trained body of public health experts, in every recognized phase of the work. The history of the Service and its achievements gives us assurance that within his organization the Surgeon General has at his command the best of advice as well as the best in the practical field.

It is well to recall something of the history of our Public Health Service, created in 1798 with the principal object of protecting maritime trade. It was known for years as the Marine Hospital Service. In 1902 it became The Public Health and Marine Hospital Service, and only in 1912 did it acquire the name which it now carries, the U. S. Public Health Service. In 1901 the Hygienic Laboratory for the investigation of infectious and contagious diseases was authorized, and in 1912 authorization for research was extended to include all diseases of man and conditions influencing the propagation and spread thereof. In 1930 further facilities for research were provided, and the name of the Hygienic Laboratory was changed to National Institute of Health.

The Service has always answered every call made upon it promptly and efficiently. Following the World War, the Service was designated as the principal agency to care for World War veterans in need of hospital care. Tremendous responsibilities were placed upon it at practically a moment's notice, and to its credit let it be said that though it was in contact with some of the most notorious scandals of the early post-war period, it escaped contamination, and investigations showed that it had been conscious of its responsibility, had provided hospitalization for veterans in the emergency, and had protected the government and the public under most trying circumstances.

Our government has never recognized the necessity of a national board of health, headed by an officer in the Cabinet of equal rank with those in charge of labor, agriculture, commerce, and similar major governmental activities. The World War taught both England and Canada the importance of the creation of such departments. In 1879, under the threat of an epidemic of yellow fever, a national board of health was created, but through lack of appropriation, almost as soon as the fear of yellow fever was over, this organization sank into innocuous desuetude, and some years later (1893), the law creating it was repealed. Many of the functions of a national board of health were assigned to the Public Health Service. Step by step these responsibilities have been increased and the field of endeavor has been enlarged; but in spite of what the Service has accomplished and the general recognition of the important place it holds, it is still a bureau of the Treasury, with an Assistant Secretary of the Treasury in direct charge.

In the April, 1936, issue of this *Journal* there was published an article by Dr. Parran, entitled "Health Security." In that article he mentioned several important problems confronting health workers that require attention at the present time. These problems included the completion of our job against tuberculosis, a real campaign against syphilis, the making available to people everywhere of facilities for the proper diagnosis and treatment of cancer, the reduction of death rates of mothers in childbirth, and babies in their first month of life, the correction of conditions resulting from improper diet, and the restoration of crippled children to lives of usefulness. It is evident that Dr. Parran has hitched his wagon to a star—a commendable aim.

It may be properly inferred that Dr. Parran considers these as major objectives of the federal and state governments in connection with the inauguration

of more extensive health work throughout the country under the Social Security Act.

It would appear that Dr. Parran is a happy choice in the selection of a Surgeon General confronted with the work of carrying out the provisions of the Social Security Act with relation to its public health aspects. In this task we wish him success and assure him of support and active assistance so far as lies within our power.

WORK FOR THE EDITOR

"BRING candid Eyes unto the perusal of men's works, and let not Zoilism or Detraction blast well-intended labours. He that endureth no faults in men's writings must only read his own, wherein for the most part all appeareth white. Quotation mistakes, inadvertency, expedition, and human Lapses, may make not only Moles but Warts in learned Authors, who notwithstanding, being judged by the capital matter, admit not of disparagement. . . . Capital Truths are to be narrowly eyed, collateral Lapses and circumstantial deliveries not to be too strictly sifted. And if the substantial subject be well forged out, we need not examine the sparks which irregularly fly from it."

This is the statement of an unusually wise man. Can we accept it? It contains much that is true, but lapses of several authors, such as those quoted by him, have led to much that is incorrect in history and emphasizes the advice of Oliver Wendell Holmes, "not to take authority when I can have facts."

Just at this time, papers are being prepared for the Annual Meeting of our Association and prospective authors are preparing material with which they hope to enlighten the world. There are times when a conscientious editor becomes very pessimistic, especially just after an Annual Meeting, when it becomes necessary to read and judge several hundred papers. One might take the kindly view expressed by Sir Thomas Browne, and even adapt the words of Cowper, "A heavenly mind may be indifferent to her house of clay, and slight the hovel as beneath her care," but we cannot bring ourselves to believe that this would make for good literature or clear understanding.

We do not wish to be pedantic, but certain expressions better avoided often occur. It is true that English is a growing language. Many words have gained new meanings, others which were correct are now incorrect or impolite; and some formerly incorrect now appear in good company. What are we to think of the professor of public health at one of our leading universities who twice in one paper assures us that a large number of children have had "diphtheria inoculations"? The editor often feels that the most unkind thing he could do to some authors would be to publish their papers exactly as they are written.

Writers seem to have a spite against certain words; "suspicious," for example, as "suspicious pneumonia." "Total" is more often used incorrectly than correctly, when the writer refers simply to a certain number—cases or population, for example. The word "period" is much abused. Instead of saying "from Tuesday to Thursday," for example, or "during 48 hours so and so occurred," we find "during a period of time extending from Tuesday to Thursday," or "a period of time of 48 hours duration"—a waste of words, if no worse. Period has several meanings. Fowler says: "A period is an era regarded as destined to run its course and be succeeded by a similar succession." The word "enhance"

seems to be growing in popularity. It sounds learned. Fowler says it is "a dangerous word for the unwary." The word "case" is a nightmare as used. The patient is not the case, the patient dies or recovers; the case terminates fatally or in recovery. The surgeon operates *in* a case but *on* the patient. Such statements as "the case gave the following history" are entirely incorrect. Another word often wrongly used is "such," for example, "when there are epidemics or impending danger of such." We often find such expressions as "The reason lies in the fact that," when it would be more clear and simple to say, "The reason is." We frequently find such statements as "Examinations, all of which were normal," meaning that the materials examined were found to be normal. One of the most common mistakes is to use "affect" for "effect" and *vice versa*. We also find such a statement as, "this disease is very fatal," as though there were degrees of fatality itself. It would be easy to extend the list of words wrongly used; but these will suffice for our present purpose.

At an Annual Meeting, at the request of a chairman of a certain session, some suggestions on the writing of papers were given. All that was said there holds good. We ask writers not to pad their papers for any reason. Historical introductions are sometimes useful and interesting, but generally the shorter the better, and seldom is there any reason for more than a few lines. Padding with quotations should be avoided. A recent contribution had some 7 pages of quotations. It is fair to assume that anyone enough interested to read a scientific paper, either has the material from which these quotations were taken, or can obtain it. Practically all journals have cut down on bibliographies. Unfortunately, in many cases there are grave doubts as to whether or not the many authors referred to have been consulted. The writer has found the same error in almost the same words running through more than 12 successive articles, evidently one quoted from the other, illustrating further the advice of Holmes. The reference was the same, and the error did not exist in the original.

One is tempted to close with an incident. A few years ago a paper was submitted which was almost unintelligible. The author of the paper had been entirely wrong in his judgment of an outbreak and of its source. He had been corrected as to facts but his ideas were still hazy and his English, if possible, was worse. The paper was practically rewritten by the editor. The statistics were corrected and made intelligible by one who understood figures, and a presentable paper was the result, yet an English journal picked this paper out for special comment.

NOTE: There are many good books on the writing of papers. The standard is *Notes on the Composition of Scientific Papers*, by Sir Clifford Albutt. American books are *The Writing of Medical Papers*, by Maud H. Mellish Wilson, and *The Art and Practice of Medical Writing*, by Simmons and Fishbein, now badly in need of revision. Several universities have their own style manuals, one of the best being that of the University of Chicago Press.

FLOODS AND THE MILK SUPPLIES

WHEN floods, tornadoes, and other disasters strike, the newspapers usually devote many fervid columns to sensational and dramatic incidents, but seldom mention the routine services that are equally significant to the protection of life and health. In describing deaths, injuries, and individual acts of heroism,

the press often overlooks the somewhat prosaic activities of the doctors, nurses, and sanitarians who are mobilized to give relief and prevent disease, and they rarely notice such humble servitors as the dairymen and food purveyors whose diligent activities often avert malnutrition and even starvation.

During the recent devastating floods in the United States, local dairymen performed especially noteworthy services. With bridges down, roads impassable, railroads out of commission, and most of their territories under deep water, the dairy companies sent fleets of trucks hundreds of miles to get the milk through. They overcame almost insurmountable difficulties in order to maintain deliveries of pure, pasteurized milk, and in some instances had to employ airplanes to transport necessary pasteurizing machinery for emergency use.

Milkmen, who were often on 24 hour duty, commandeered rowboats, power-boats, canoes, and rafts for their deliveries; they waded waist high through swirling and dangerous currents; they climbed precariously along fences and over narrow planks, so that no child should be deprived of this essential food. Farmers appeared around the bend of what had once been the road, in boats or on horse-back, carrying cans of milk that distributors could pasteurize and bottle for prompt delivery under hazardous conditions to private homes, to the marooned and to refugees, to national guardsmen and Red Cross workers, and above all, to the mothers of infants and young children.

The dairymen and the milk companies in the flooded regions made contributions to public health that the local health officers will not soon forget. Their achievements and sacrifices were recognized editorially by a number of leading newspapers, including the *New York Times*, indicating that the public as well as the medical profession is not unappreciative of the labors of its milkmen heroes during this calamity.

To appear in July Journal

The Trained Public Health Engineer in Public Health Departments—*Charles Gilman Hyde*

Vitamin D and Child Health—*Fred O. Tonney*

Detection of Shedders of Streptococci Responsible for Infectious Bovine Mastitis—*W. N. Plastridge and E. O. Anderson*

Diphtheria Immunization—*William Edward Bunney*

PUBLIC HEALTH EDUCATION*

"When the literary apprentice has read the masters of the English tongue he should know 'classic' English when he sees it. This is every man's best foundation style, whether he wishes to write novels, become a journalist, or write letters home to mother.

"There is no great gulf between 'classic' English and newspaper English at its best. The aim of both is effectiveness of assertion. And effectiveness of assertion, says Bernard Shaw, is the Alpha and Omega of style."

In "Learning to Write" in "Writing for the Press," by L. Russell. A. and C. Black, London. (Macmillan Company.)

Ninety-Nine Thousand Deaths—"Accidents of All Types Take 99,000 Lives During 1935" is the title of a press release from National Safety Council, 20 N. Wacker Drive, Chicago, Ill. *Free.*

Among the details is the 1 per cent increase of deaths by motor vehicles, and the occupational accident deaths, less than half those due to vehicles, and less than half what they were 25 years ago!

Five Little Teachers—Again the 5 little Canadian girls have served their sisters throughout the two countries. In the last week of March, N.E.A. Service syndicated "Dr. Dafoe's Own Story of the Quins." The delightfully conversational statements about the mental and physical health of the babies seem to offer much quotable material, but N.E.A. Service has informed us that the writings of Dr. Dafoe may not be reproduced, or quoted.

A New Service and a New Periodical—Adequate provision for public health education is promised through the newly organized Office of Public Health Education, U. S. Public Health Service, Washington, D. C.

An official announcement of the rather heavy undertaking of the new office is quoted from *The Health Officer:*

The responsibilities of the U. S. Public Health Service are increasing along with the increasing complexity of modern life. Although the dissemination of knowledge is now generally recognized as a supreme duty, not only of educators, but of public health workers, and, indeed of all scientists, no organized and concerted effort has been made by the Service, up to the present time, in the field of health education.

Such an effort has been initiated in the recent establishment of the Office of Public Health Education, under Assistant Surgeon General L. R. Thompson, Chief of the Division of Scientific Research. The purpose of this office is to carry out certain experimental studies in health education.

The initial activities of the Office of Public Health Education embrace 6 major duties. First, the training and instruction of young commissioned officers of the Service; second, special instruction for educators, health officers, and sanitarians from state health departments, and from health departments of

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

foreign countries, and for other eligible individuals. Third, the office will make studies of educational methods employed in various health agencies and in other fields of education, with a view to adapting the methods to our own purposes, and to developing new and improved methods. Fourth, experimental studies in mass adult education, through the use of the radio, will be made for the purpose of evaluating various methods of radio education. Fifth, permanent records of available material will be filed and will be a repository of authoritative information in the field of health education. Sixth, the Office of Public Health Education will prepare a bulletin of current health information, primarily for the personnel of the Service. The first issue of this bulletin is now in the hands of its readers and is titled *The Health Officer: A Digest of Current Health Information.*

Advances in the general sciences and in medical science, especially, leave us wondering how it is possible for the health officer to acquire, hold, and augment his knowledge of the ever expanding fields of public health and preventive medicine. One of the primary functions, then, of this office, will be to issue a monthly digest of current public health information, for commissioned and other officers of the Service, for health officials throughout the country, and for those of the laity who are interested.

The purpose of *The Health Officer* is to report the activities and progress of our fellow officers in the various stations of the Service. Current happenings in any branch of personal, community, or public health, and in other branches of science concerned with the public welfare, will be reported.

Each month, *The Health Officer* will present abstracts of important and pertinent articles from the current literature in community health and sanitation, public health administration, public health methods, preventive medicine, personal hygiene, social sciences related to medicine, and other related fields. Reviews of significant books in these fields will be included.

The Health Officer, as its title and aim indicate, is "of" and "for" the health officer of today. That it may also be "by" him is the hope of the Office of Public Health Education. Any officer possessing information of general interest to the personnel of the Service is invited to write the office about it, in order that the news may be shared through this publication. Officers are further invited to outline their own activities by summarizing the material and submitting it for future issues of *The Health Officer.*

The 23 letter-sheet mimeographed pages of the initial issue include:

an announcement of the new service, a welcome to Dr. Parran, "Commissioned officers' training course now in progress," book reviews, abstracts of articles, and "annotated articles."

Write U. S. Public Health Service if you wish to receive copies.

Now Easier to Handle—Have you noticed the added words and numerals at the tops of pages of the *Journal,* starting with January, 1936, issue?

A helpful device for those who receive an extra copy of the *Journal* so that articles may be clipped and filed by topics or by prospective uses. At least many of the clippings will be dated automatically at the top.

A set of *Journals* plus classified clippings makes the ideal set-up for wider use of the magazine.

An Exhibit May Be Too Lifelike—Models of buildings or displays using human figures, animals, etc., may be too lifelike to be educationally effective. The more nearly perfect such displays are the more likely that visitors will be so absorbed in the perfection of the figures or buildings that they get little of the lesson supposed to be taught. And dolls are equally distracting. Either they are foolishly "doll-like," or they are such "cute" lifelike reproductions.

More effective, and less expensive, are photographs mounted and cut out. Such cut-out photographs used by Pennsylvania Sanatorium for Tuberculosis and by Henry Street Visiting Nurse Service are shown in "Publicity for Social Work," by Routzahn (Russell Sage Foundation). See opposite page 300.

Negro Health Week Any Week—The annual Negro Health Week is past, but Dr. R. C. Brown, Director of

the Week, U. S. Public Health Service, Washington, D. C., calls attention to the fact that in numerous communities for various local reasons, Negro Health Week will be celebrated at a later date.

For copies of the program, a sermon, and a radio talk, write to Dr. Brown.

A program folder is neatly done on one sheet with French fold, printed both sides. The sheet, 19½ x 12½ inches, is folded twice so that the 4 chief pages are seen as 9¾ x 6¼ inch pages. When the whole is unfolded there is the 19½ x 12½ inches for an inspirational display of activities and printed matter gathered from many cities in previous years.

Health Education in Canada– As reported in *Canadian Public Health Journal,* 105 Bond St., Toronto, Ontario. April, 1935. *35 cents.*

Public Health Education Section of Canadian Public Health Assn.: Chairman, Dr. G. F. Amyot, North Vancouver; Vice-Chairman, May Power, Toronto; Secretary, Dr. Stewart Murray, Vancouver.

In the joint health meetings at Vancouver in June, 1936, the newly formed British Columbia Health Assn. will unite in one session with the Public Health Education Section under the chairmanship of Dr. Amyot.

In the May, 1936, annual meeting of Ontario Health Officers' Assn., Dr. D. V. Currey, Medical Officer of Health, St. Catherines, Ontario, presented "The Local Board of Health as Its Own Publicity Agent."

A page is given to a tuberculosis exhibit in Vancouver, B. C.

"Brantford, the 'No Diphtheria Town'" tells of Brantford's annual immunization campaign in which a letter to parents said:

> Dr. Dafoe gave the toxoid treatment to the Dionne quintuplets; your baby is deserving of the same protection.

A brief report is given of the Eighth Annual Conference on Health Education, organized by the Central Council for Health Education, held in London on November 21, 1935.

The Martin Family Broadcasts— Several years ago this department of the *Journal* expressed its appreciation of the Martin family broadcasts put on in Racine, Wis. Dr. W. W. Bauer, then Racine Health Commissioner, and Mrs. Bauer were responsible for this effective pioneering in the use of simple dialogue in broadcasting.

In *Hygeia,* May, 1936, Dr. and Mrs. Bauer, under the heading, "The Martin Family Vacation," explain the idea, and present two of the episodes.

> The dramatized radio health episodes in this series are selected from 115 such programs broadcast by the Health Department of Racine, Wis., in the last 9 months of 1931, by courtesy of the radio station of the *Racine Journal-News,* now the *Journal-Times.* They have been rebroadcast by medical society and medical auxiliary groups locally. They have been edited and brought up to date for this, their first publication. . . .
>
> The simpler programs here published were broadcast originally with casts furnished by dramatic classes from the William Horlick High School and the Woman's Club of Racine. They can be used as brief platform episodes with simple stage settings, as radio broadcasts over a school public address system or as class-room projects for pretended broadcasting. Teachers will readily find ways of using them and of interesting the classes in providing sound effects, settings, and other accessories.
>
> Any medical society, health department, or voluntary health organization organized and administered not for profit is granted permission to produce this material, provided no admission charge is made. Credit should be given to *Hygeia* and to the authors. If the radio episodes are to be used in a program broadcast at regular intervals (weekly, for example), a uniform introductory announcement like the following, modified to suit local conditions, may be used. It is spoken by the station announcer or by the sponsor of the program, not by one of the players in the episode to follow. It is more effective when spoken "above" the music; that is, with the music toned down to a faint background

for the words, then swelling again to full volume when the speaker concludes:

"During the next 15 minutes we bring you the program of the ..... This program, which comes to you each ..... at ....., is broadcast under the auspices of the ..... which believes that the health of the people is the greatest asset of the community and that health is based primarily on knowledge and understanding of the principles that govern it. Watch for this broadcast regularly at the same hour each ....."

When the episodes are used as platform sketches a dark stage with a radio instrument on which a spot of light is trained, leaving all else invisible, is effective. Under such conditions the same announcements may be used as for radio presentation, but of course the sketches must be memorized, while for the radio they are read from script.

The episodes may also be presented as sketches on a set stage; the setting in each case is suggested by the announcement preceding each script but should not be elaborate in any event. In such a case the announcements would be modified or omitted, especially if a printed or mimeographed program were distributed.

The episodes are best presented in series. They may be used to fill a large gap or just a "spot" in the radio or platform program, as the case may be.

Plan of the Individual Broadcasts—Sequence: Chimes or fanfare. Introductory musical theme begins forte, fading after about 1 minute. Introductory announcement "above" pianissimo musical background: Station Announcer. Musical theme finishes forte. Day's announcement: Station Announcer. Dialogue (10 to 12 minutes). Closing announcement: Station Announcer. Closing music, same as opening theme. Chimes or fanfare.

A phonograph record is suitable for the musical theme. Under present radio commission rulings, a phonograph record used only as an introductory theme incidental to other material need not be announced as a record. The selection should be a lively one, such as "The Parade of the Wooden Soldiers," or a march, like "El Capitan," or "Officer of the Day," but it should not be jazz.

The May issue of *Hygeia* reproduces "What Kind of Vacation?" and "The Doctor Suggests."

If you are at all interested in popular health broadcasts we hope that you will read these two episodes. Further installments will appear in *Hygeia*.

Home-Made Silhouette Making—For exhibits and for printed matter, silhouettes offer effective illustrations. The *New York World-Telegram* (March 21, 1936) tells how to make them—

With a bed sheet, a bridge lamp and a floodlight bulb the amateur photographer can amuse himself by making silhouettes while he waits to take his camera outdoors.

In this simple sideline to indoor photography, anyone can give free play to ability in composing a picture, with the problem of lighting reduced to the A B C's. A little imagination and experiment in posing will be rewarded with silhouettes that are dainty and graceful, amusing or startling in their portrayal of personality.

To make camera silhouettes, hang up a large sheet smoothly so it comes to the floor. A wide doorway is a good spot. Five feet behind the sheet place a bridge lamp with a 750-watt photoflood bulb and a silvered reflector. See that the lamp illuminates the sheet evenly.

Pose the person or group to be silhouetted 2 feet in front of the sheet.

Use fast film for indoor photography. Set the camera, on a tripod or table, far enough from the subject so that it is all visible in the finder. Arrange it for a time exposure, with the diaphragm at stop 8 on cameras using the "F" system, or at stop 1 on cameras with stops numbered one to four.

When the picture has been posed have the subjects remain motionless and turn on the flood lamp and expose for two seconds.

A good way to time a two-second exposure is to open the shutter, say aloud, "A thousand and one, a thousand and two," and close the shutter.

Try To See It as He Will See It—If you issue a small sized mimeographed report, and if you wish to use some tricky folding, ask for a copy of the 1935 report of the Meriden, Conn., Public Health and Visiting Nurse Association. And if you make use of the "Do You Know" form of stating certain facts about your agency note the possible gain in making the heading read "Do You Know That";

and if you have a folded step back front, and if you have a last line making an important point, note how you could make this line and the preceding one into a complete statement, provided that the last line is centered and set in the same type style as the one visible above it. In other words, scrutinize your dummy for additional touches, whatever form of report you may issue. Try hard to see it as it will look to the man who receives a copy of the completed report.

Mailing Lists Are Exasperating—The only answer is personal supervision. And that means a personal examination, say once a year.

Recently experiences of several people have emphasized mailing list possibilities under usual office routine.

When a mailing list is important, or sections of it have much value to your organization it can't be left wholly to routine handling. Whatever the system for handling addresses, it seems worth while for a responsible executive to give it a personal check-up every year or two. Not many health agency lists are so extensive, and their importance so limited, that this could not be done.

"Eye Openers"—Under this title Dr. E. Krimsky answers questions which

> Every doctor will recognize as questions which have been presented to him by patients in the course of his medical experience.

Here are some of the questions:

> Is there danger of eye glasses breaking and causing injury to the eyes?
>
> Will I always have to wear glasses?
>
> Are tobacco and alcohol injurious to the sight?
>
> Are circles under the eyes a sign of eye trouble?

In *Sight-Saving Review*, National Society for the Prevention of Blindness, 50 W. 50th St., New York, N. Y. March, 1936. *50 cents.*

In the same issue: "Eye Health Primer for Nurses"; "A Sight Conservation Program in School" (Dallas, Tex.); "Eyes Right" (reprinted from *Good Housekeeping*. Feb., 1936).

An Adaptable Idea—*Hoosier Health Herald*, Indiana Tuberculosis Assn., Indianapolis, says:

> The National Tuberculosis Association has compiled a scrapbook in which are mounted all the reprints in the field of school health education distributed in recent years. A person visiting that office may see this splendid portfolio which contains reprinted articles on "Healthful School Living," "Health Service," and "Health Instruction." Until articles of this nature are brought together and mounted, one hardly realizes what a wealth of material is available.
>
> Local tuberculosis associations may profit by this suggestion and arrange in a scrapbook or portfolio material which they make available to school teachers. Thus teachers may look over the material which is available and more wisely select those things which meet their needs. A scrapbook is especially good, for it may easily be taken out of the office to teachers' institutes or teachers' meetings where it will prove very useful. A loose leaf folder makes it easy to remove out-of-print material and to add new things from time to time.

An even simpler and less expensive form of portfolio has been used for several years by the Social Work Publicity Council. Kraft (brown wrapping) paper, cut to 14 x 11 inches, 3 holes punched at the left is used. A cover sheet, 14 x 22 inches, is folded once, carries a pasted label, black letters on a gay bit of paper. The number of sheets varies with the subject. It is easy to divide the subject matter for convenient use. Short pieces of cord, about the color of the paper, are tied through the 3 sets of holes in sheets and covers, the knots being placed *inside the back cover.* Many readers have seen these portfolios at Annual Meetings of the A.P.H.A. or the National Conference of Social Work.

The N.O.P.H.N. has a series of portfolios using a more attractive paper cut to 18 x 12 inches.

Make up collections of your own printed and duplicated material. Gather groups of samples from other sources. Whatever subject interests people who come to you for information and advice may be represented by a portfolio, even if the material is limited.

You will be surprised at the interest shown by your visitors, who won't need nearly so much of your time when you can hand them a portfolio to look over.

Lower-Case Heads Win—Probably certain lavish uses of capital letters have misled many who wanted to get attention. We want people to look at what we print. We want people to think what we print is important. So we use plenty of capital letters—and make them as big as we can.

But in the 6th annual Exhibition of Newspaper Typography, sponsored by N. W. Ayer and Son, 8 of the 9 newspapers given awards used lower case headlines, with but limited use of capitals. The 9 were selected from 1,444 newspaper entries. The *New York Herald-Tribune* won over the *New York Times*, the latter being the only one of the 9 making use of all cap heads.

The moral? If newspapers don't need a mass of caps to get attention and to help make sales?

And in Annual Reports Also—"Find it if you can" seems to be the theory which guides health education discussion in health department annual reports.

In this section of the *Journal*, April, 1936, page 424, we called attention to the simple device employed to bring out the health education material in all divisions of the Pittsburgh Health Appraisal report. The absence of that sub-heading, "Community Health Instruction" under any main heading, emphasized the lack of health education activities. This use of the sub-heading also made easily available whatever was said on the subject.

Important health education, likely to be carried on in communicable disease, child welfare, or other bureaus, may not be reported because the chiefs are more interested in other aspects of their activities. An understanding that a public health or adult health education heading should be used if possible, would keep the matter before the chiefs of divisions or bureaus.

The use of data or explanation of a division or bureau might be recorded under this heading. Vital statistics might report the use of data in health education by some other division of the department. Laboratory might report that its services to the public had been reported by the department in broadcasts, a series of news releases, or a newly issued folder. And so with others.

Cancer Education Via Radio—Says *Bulletin*, American Society for the Control of Cancer, 1250 6th Ave., New York, N. Y. (April, 1936):

In the process of developing various methods of reaching the lay public in the campaign of cancer education the radio has begun to assume a position of outstanding importance.

Among the pioneers in the field has been Dr. W. A. O'Brien of the University of Minnesota. For a number of years he has given a weekly health talk over the radio. In this series of talks he has frequently utilized some phase of the cancer problem. This has been accomplished in one of two ways. Either some topic in the field of cancer research, treatment or education has been dealt with directly or information on cancer has been cleverly introduced as a contrast to some other subject under discussion.

The Massachusetts State Department of

Health has also sponsored a series of talks dealing directly with various phases of the cancer problem. The interest in both of these ventures has been sustained and encouraging.

More recently the Cancer Committee of the Louisiana State Medical Society under the chairmanship of Dr. Lanford has conducted a large number of broadcasts. Other states are rapidly following suit. The American Society for the Control of Cancer has built up a series of radio talks on cancer contributed by its directors and by the chairmen of its state and other local branches. These talks are in ever increasing demand from all parts of the country. . . .

Perhaps of even greater significance is the highly successful dramatization of playlets dealing with cancer education. There have been two outstanding pioneers in this respect: the American Medical Association and the New York State Department of Public Health. The former conducts a public health program weekly and has dramatized successfully some aspects of the cancer problem. This program has been broadcast by the National Broadcasting Company from which organization permission to use the material must be obtained.

The New York State Department of Public Health has given a series of playlets known as the Health Hunter Series . . . The acting and voices are excellent. A sound record has been made so that the program can be given throughout the state. The records are in great demand . . .

Each such step in public education buries deeper the rapidly disappearing specter of cancer phobia and serves as a guarantee that the efforts to encourage a more enlightened public attitude toward cancer control are bearing fruit. Knowledge of the success which has attended these pioneer advances should spur others to the utilization of the motion picture, the press, magazines, and the stage as vehicles for expression. The period of free speech on cancer control has only just begun. We may expect the future to provide progress not only in the amount of publicity but in the ingenuity in the forms used to carry the educational message.

Farewell to American Child Health Association—The Sept.-Nov., 1935, issue of *Child Health Bulletin* appeared in April, 1936. Published for a number of years by American Child Health Association, this final issue was devoted largely to "The Story of the American Child Health Association," by Dr. Philip Van Ingen.

It is a heartening record. It will be a revelation to many to read in brief compass the record of the several groups and the combined organization, from June, 1908, through to August 13, 1935. Probably copies of this issue have been received by numerous health and education bodies, and by public libraries.

This issue includes 7 pages of annotated "Child Health Literature," which has been so ably presented for years by Ellen C. Babbitt. Will not some health or education periodical continue this splendid service?

Health Education, Journal, March, 1936—Of interest in *American Journal of Public Health:*

"Laws, Dealer's Insurance" (page 228), editorial from *Daily Record*, is good for use with local milk producers and distributors.

In "Books and Reports" see "Free Medical Care, Socialized Medicine" (page 302), and "Mother and Baby Care in Pictures" (page 305).

On page 310 are listed new members of Public Health Education Section.

Wanted back numbers of the *Journal* are noted on page 286.

An important suggestion appears on page xix. The paragraphs preceding the "form of bequest" illustrates one way of presenting the idea of "gifts and bequests." Too often the "form" is given without any explanation. Any health agency may present its claims in a dignified and effective manner when offering a "form of bequest."

References to health education and to the Public Health Education Section are to be found in the supplement, *American Public Health Association Year Book.*

Be sure to read "The Foreword" (page vii).

The Health Conservation Contest

winners are listed year by year (pages 31–33).

The Committee on American Museum of Hygiene "reports progress" (pages 36–37).

"Food Fallacies and Nutritional Quackery" (pages 58–63), report of the Committee on Nutritional Problems, is likely to be particularly helpful as background material and for direct quotation.

"Methods in Health Education" pages 207–208), is a progress report of a Section committee, Ira V. Hiscock, *Chairman. All concerned are urged to give this report careful consideration, and to submit comment, suggestions, and further questions to any member of the committee.*

In "Public Health Aspects of Noise Abatement" (page 225), report of the Committee on Noise, is a plea for education of the public—

in the needlessness of most noise, its ill effects, and the possibility of its abatement.

Health Education in April, 1936, Journal—Items of interest in the *American Journal of Public Health*, April, 1936:

In "District Health Administration in Large Cities," by Rice and Barnard, see organization charts (page 324), and paragraph on health education (page 326).

"Authoritative Standards and Association Policy," by Frost (pages 336–343), discusses problems which concern the Public Health Education Section and its future.

The group of articles on spray residue on fruits and vegetables (pages 369–389), including references to publicity, may be useful as consumers' groups are aroused by statements of danger from poison on fruits or vegetables.

"Dr. Arthur J. Cramp" (page 381) records the retirement of the long-time chief of what was once the Propaganda and Reform Bureau of the A.M.A., whose record should be known to all who seek to inform the public of commercial dangers to health.

In "Practical Application of An Industrial Health Appraisal Form," by Bristol (page 391), are scoring values suggested for "General Health Publicity" and several health education items under other general headings. See also paragraph on page 394.

"Books and Reports" (pages 432–438) is the annual "review of selected books of interest to public health workers."

Under "A Selected Public Health Bibliography With Annotations" see "Foods That Fight" (page 445), and "Education and Appendicitis" (page 446).

"The Health Conservation Contests" (page 447) is a brief review.

Eight new members of Public Health Education Section are announced (page 449).

Hygeia, May, 1936—Published at 535 N. Dearborn St., Chicago, Ill., the May, 1936, issue of *Hygeia* includes:

Child health . . . Florence Nightingale ("where is her modern counterpart?") . . . Food for two (mother and unborn child) . . . Myths about cancer . . . Helping the child to conquer fear . . . The Jack and Jill house (how the house may be made fit for children) . . . Frauds that flourish until Uncle Sam takes a hand . . . What parents should know about tuberculosis . . . Can you prove that you are a citizen? . . . The case of the pig and the party (a medical mystery) . . . The streptococci (germs we live with) . . . How disease came with the white man (malaria and yellow fever) . . . William Osler (a leader among clinicians) . . . The Martin family vacation (a radio series) . . . The skin in health and disease . . . Babies in bed . . . "Safety First" for children illustrated . . . Health news pictures . . . Questions and answers . . . New books on health.

Under "School and Health" conducted by J. Mace Andress:

Do you know what you may reasonably

expect of your pupils? . . . An experimental program in rural school health education, presented in "Getting results through united effort," "Teacher assistants in health education," and "Building a health education curriculum." . . . New health books for teachers and pupils.

The P.H.E. Section in the Year Book—In the A.P.H.A. Year Book, issued March, 1936, the Public Health Education Section is represented as follows:

Elective Councilors: Philip S. Platt, Donald B. Armstrong, William P. Shepard, John Sundwall.
Associate Editor of the *Journal:* Evart G. Routzahn.
Committee on Meetings and Publications: Homer N. Calver.
Sub-Committee on Scientific Exhibits: Calver, Routzahn, Bertrand Brown, H. E. Kleinschmidt.
Committee on Fellowship and Membership: Shepard.
Committee on Research and Standards: Clair E. Turner.
Committee on Professional Education: Sundwall, and Shepard (Consultant).
Sub-Committee on the Educational Qualifications of Health Educators: Sundwall.
Nominating Committee: Mary P. Connolly.
Sedgwick Memorial Medal Committee: Armstrong.
Committee on American Museum of Hygiene: Victor G. Heiser, Brown, Sally Lucus Jean, Routzahn.
Affiliated State Public Health Societies:
Connecticut: Ira V. Hiscock, Secretary-Treasurer.
Michigan: Marjorie Delavan, Secretary-Treasurer.
Pennsylvania: J. Clarence Funk, Executive Secretary.
Texas: Lewis Bracy, Secretary-Treasurer.

The Section officers and Section Council are listed on page 12.

Public Health Nursing Samples Wanted — For several years the National Organization for Public Health Nursing, 50 W. 50th St., New York, has been circulating a group of portfolios of samples.

Beautifully prepared, these portfolios have made available selected material classified as printed matter, exhibits, general publicity information, movies, plays and pageants, radio. For revising this collection the N.O.P.H.N. requests samples of

booklets, blotters, bookmarks, newspaper articles, visiting cards, copies of radio talks and playlets, photographs of exhibits, etc.

The portfolio idea is commended to nationals and to state health agencies. In the office, at conventions, and in circulation from city to city such portfolios render a valuable service which cannot be duplicated by any other method.

FOR EDUCATION AND REFERENCE

"Anthraco-Silicosis Among Hard Coal Miners," by U. S. Public Health Service. Supt. of Documents, Washington, D. C. *25 cents.*

"Death Rate for Children Decreases," by J. F. Rogers, M.D. 2 page reprint. Office of Education, Washington, D. C. *Free.*

"Dental Health Week in Delaware," by M. H. Harrington, *Journal,* Dental Hygienists' Assn., 159 Brightwood Ave., Stratford, Conn. Jan., 1936. *25 cents.* Details of radio programs; plays and verses by children.

"The Hard of Hearing," by G. Berry. Revised reprint. American Medical Assn., 535 N. Dearborn St., Chicago, Ill. 4 *Hygeia* pages. *5 cents.*

Irradiated Evaporated Milk Institute, 203 N. Wabash Ave., Chicago, Ill., offers free publications on evaporated milk and its use.

"Pneumonia." Four page folder. New York State Dept. of Health, Albany, N. Y.

"Safety Education Research Survey of the Boston Public Schools." Mimeographed outline of WPA Project 7369. Address John P. Sullivan, Supervisor of Health Education, Boston Public

Schools, 15 Beacon St., Boston, Mass.

"Training of Elementary Teachers for School Health Work," by J. F. Rogers, M.D., Office of Education. Supt. of Documents, Washington, D. C. *5 cents.* 27 pages. A review of what is being done—and not done.

Two reprints on the need for state legislation to require proper labeling of lye and other caustics will be supplied by B. R. Rickards, State Dept. of Health, Albany, N. Y. A section committee of A.M.A. on lye legislation has published its thanks to Mr. Rickards for his effective aid in securing such legislation in New York.

MAGAZINE ARTICLES

"Eyes Right," by Dr. J. H. Kenyon. *Good Housekeeping,* 8th Ave. and 57th St., New York, N. Y. Feb., 1936. *25 cents.* Care of baby eyes.

"Machines Which Imitate Life," by G. W. Gray. *Harpers,* 49 E. 33d St., New York, N. Y. Feb., 1936. *40 cents.* Says the *Journal* (page 307, March, 1936) of this article:

> Is an excellent example of the possibility of putting into plain English a subject as obtruse as biophysics or physical chemistry.

"Safe at School!" by H. Barnsantee. *Rotarian,* 35 E. Wacker Drive, Chicago, Ill. May, 1936. *20 cents.* Teaching important car driving facts in school.

"Prostitution in the Soviet Union," by A. W. Field; "Prostitution in New York City" (editorial contrasting the situation in New York and other cities). *Nation,* 20 Vesey St., New York, N. Y. March 25, 1936. *15 cents.*

"Public Health Nursing," by D. Deming. *Junior League Magazine,* 305 Park Ave., New York, N. Y. May, 1936. *30 cents.* What a public health nurse is, and how volunteers may help.

"Society's Ounce of Prevention," by H. H. Martin. *Junior League Magazine.* May, 1936. Abortion and maternal deaths as reasons for birth control.

"When to Immunize and Why," by Dr. W. W. Bauer. Various diseases of children. *National Parent-Teacher Magazine,* 1201 16th St., N.W., Washington, D. C. May, 1936. *15 cents.*

"You Can't Laugh It Off," by J. Lane. *Collier's,* 250 Park Ave., New York, N. Y. March 21, 1936. What *can* be done about too much fat.

BOOKS AND REPORTS

The Work of the Sanitary Engineer—*By Arthur J. Martin. London: MacDonald and Evans,* 1935. 488 pp., 81 ill. Price, 16 s. net.

"An ample supply of good water, the prompt removal and hygienic disposal of all foul matter—these are the indispensable foundations of healthy life." Ways and means of obtaining these necessities are dealt with by the author under 6 main headings: Part I, Sanitary Administration, 57 pp.; Part II, Water Supply, 130 pp.; Part III, Drainage and Sewerage, 65 pp.; Part IV, Sewage Disposal, 130 pp.; Part V, Collection and Disposal of Refuse, 35 pp.; Part VI, Flood Prevention, Land Drainage and Coast Protection, 25 pp.

This comprehensive handbook covers a broad field in a workman-like manner. The 46 tables of hydraulic and cost data will be found especially convenient in supplementing the more descriptive matter. Historical background is adequately covered and administrative and legal aspects are given deserved weight. To the American sanitary engineer, the book is valuable in giving an excellent general knowledge of English practice. To the sanitary administrator, especially of England, the book is ideally suited. So much of the subject matter is fundamental and is so authoritatively treated that the volume will be of great value to sanitarians of all countries.

Mr. Martin, as a lecturer to students in sanitary science, as an instructor of Army sanitary personnel, and as an examiner of candidates for the Institution of Sanitary Engineers, is well qualified to discuss the sanitary engineer of England. Due to the broad field covered, the discussions of individual subjects are of necessity brief, but the book covers in one volume the essentials of what the sanitary engineer in England and elsewhere should know.

A. M. BUSWELL
M. LEBOSQUET, JR.

Elementary Bacteriology — *By Joseph E. Greaves, M.S., Ph.D. (3rd ed.) Logan, Utah: Utah Agricultural College,* 1936. 562 pp. Price, $3.50.

For this 3rd edition many portions of the original have been rewritten or revised, and several new chapters added. The historical portion is presented in an attractive manner. The main body of the work sets forth the chief characteristics of bacteria, their growth and action. Soil bacteria and their significance are given more prominence than in most textbooks on bacteriology. The description of the relation of these bacteria to food production, industry, and the arts is most interesting. The pathogenic bacteria are described as related to the diseases they cause, also as to means of identification and the general measures to be adopted to destroy or control them.

Improvements might be made by giving definite references, as on pages 233 and 388, for the many quotations inserted, or, as on page 100, by giving a bibliography for each section. It would be well, to be more specific in naming places, such as Charleston, page 488. The reader might suspect it was Charleston, South Carolina, but he might also think of West Virginia.

The author does not indicate the source of the figures presented on pages 477–478. If they are U. S. Census Bureau figures, it would be well

to say so. The author makes a loose use of terms when on page 496, he speaks of "death rates." What he has in mind is fatality rates, though he has given not rates but totals, and his estimate that 10 per cent of all typhoid cases die, is higher than now obtains except in rare outbreaks. As the author says (page 472), "inspection alone cannot be depended upon" to detect bovine tuberculosis. This statement should be taken as a corrective to the picture presented of a tuberculous cow, as most infected animals show no such visible signs as the one pictured. These are minor defects, and do not materially detract from a very interesting book, which is well printed and easily read. A typographical error was noted on page 214, line 32 from the top.

JAMES WALLACE

American Chamber of Horrors—*By Ruth deForest Lamb. New York: Farrar & Rinehart,* 1936. 418 pp. Price, $2.50.

The Food and Drug Administration, the author, and the publisher, by preparing this enlightening text, have performed an important service for the American public. They incidentally illustrate also why food and drug legislation encounters so many obstacles: it tries to cover too much ground.

It seems to the reviewer that food and drug control interests often err in attempting to invoke the cause of public health to justify entirely appropriate activities for the prevention of fraud. Most of the Copeland Bill, for which this book is obviously propaganda, has to do with fraud.

The public health side of this exposé is generally known to public health people, although it is claimed that the inside story of the fight to protect consumers against spray residues is told here for the first time. This book is a dramatic, even startling, presentation of the problem of food and drug control and the serious dangers of many products available to the public. It is accordingly a useful contribution to health education.

The American Medical Association is quoted in regard to two dubious products, but there is no comment on its long and valiant fight in this field. Haven Emerson is quoted as President of the "Public Health Association," and indexed under "Public Health Service."

After reading this book one wonders what might be the fate of a bill designed solely from the standpoint of public health protection and which left to other policing agencies public protection against commercial fraud.

Government represents not only consumers but also producers, manufacturers, and distributors. It is thus handicapped in legislating beyond a certain point wholly and entirely in the interest of consumers, or in protecting buyers against the wiles of sellers who, be it said, are voters also. Organized consumer action is more likely to accomplish this as well as the repeal of such legislation as that which makes it harder to buy clean oleomargarine than dirty butter.

Meanwhile the Chief Educational Officer of the United States Food and Drug Administration has written a thoroughly useful book with informative appendices to add to the growing modern library of political campaign literature. HOMER N. CALVER

The Algae and Their Life Relations—*By Josephine E. Tilden. Minneapolis: University of Minnesota Press.* 550 pp. Price, $5.00.

This volume by the author of *Myxophyceae of North America and Adjacent Parts* carefully carries the sub-title "Fundamentals of Phycology." Recognizing that reference works dealing with special phases of the

field of phycology are available to the experienced investigator, Miss Tilden has set herself the task of preparing a textbook which includes in a single volume all classes of algae in orderly fashion and answers such broad questions as:

> Are there connecting links between the several classes of algae?
>
> Is there a relationship between the several classes of algae and the higher plants, or between the algae and the primitive or the higher animals?
>
> What is the probable place of origin or point of unusual development of any particular algal group with respect to the geological history of the world?

The book opens with 3 thought provoking chapters (47 pp.) on the history of the evolution of the algae, the distribution of the marine algae in time and space, and the classification of the algae in the light of their evolutionary development. These serve as an introduction to the 5 central chapters of the book which deal with the life histories, morphology and taxonomy of the 5 classes of algae: blue-green (52 pp.), red (106 pp.), brown (120 pp.), yellow-green (16 pp.), and green (120 pp.). The marine organisms receive the largest share of the space. Where the organisms under discussion are of some economic (particularly nutritional) value, the author does not hesitate to elaborate on this aspect of phycology. Three closing chapters consider briefly the problem of algal control and the algae as food for animals and for man (22 pp.). An appendix on how to draw algae for publication, a bibliography, and an index complete the volume.

To the public health engineer who is interested in the relation of the algae to public water supplies, Tilden's book will serve as a useful aid in the identification of genera and species. The excellent discussion of the life cycle of the algae should be of assistance in gaining an understanding of their method of propagation especially in relation to their control. A very direct interest should be the record of poisoning of livestock compelled to drink water-bloom algae. This is given in Chapter IX.

The nutritionist will find much of interest in Miss Tilden's discussion of algae as food for man (Chapter XI) and in her comments upon the manifold possibilities in the utilization of marine algae (Chapters V and VI).

The book is well written and contains excellent illustrations. The printing and binding are good.

GORDON M. FAIR

A Guide to Human Parasitology for Medical Practitioners—*By D. B. Blacklock and T. Southwell (2d ed.). Baltimore: Wood,* 1935. 259 pp. 122 figs. Price, $4.00.

On the basis of its purpose as stated in the title, this is a very useful and satisfactory publication. It has the limitations of any book in which a writer undertakes to condense into 259 pages the large subject of human parasitology. The authors warn the reader that many of the statements are true only of the limited number of parasites with which they deal, are not true of all human parasites in the groups discussed, and are even less often true of the groups as they occur in animals. It might be of value to add to future editions a list of the many parasites not covered.

The writers devote 8 pages to a discussion of the microscope and its use. The reviewer is under the impression that a knowledge of the use of the microscope could be safely predicated for American physicians graduating within the past 20 or 30 years, and hopes that this is not an unwarranted optimism.

The arrangement of the book might be modified to advantage. Thus, Chapter XIII, Examination of Ma-

terial, is placed between a chapter on cestodes and succeeding chapters on cestodes and on other worm parasites; apparently it should precede all other chapters on worm parasites.

There are some grammatical errors, such as *feces* as the subject of a singular verb (p. 24); the frequent displacement of the word *only*, this wording tending to occur too early in an expression, as it customarily does in casual speech (p. 30, *et al.*); errata in cross-references, as in the reference to Fig. 46 on p. 41, which should be to Fig. 47, and the reference on p. 50 to p. 25, which should be to p. 24; the statement that a disease is very fatal, since fatal diseases are not more or less or very fatal (p. 70); certain discrepancies between text figures and descriptions (pp. 75, 76, 77); the statement that the alimentary canal of trematodes consists of a small mouth (p. 139); the habitual use of the terms egg and ovum as different things, contrary to customary usage, without definition of the terms as used (p. 159, *et al.*).

The authors (p. 102, *et al.*) accept the existence of pressure as an explanation for the development of alveolar hydatid, which seems too simple, and the matter is still an open question. The keys are highly variable in form and should be made uniform. In some cases, as on p. 110, species keyed to a number (3) should actually appear as a name (*Hymenolepis nana*) at the point where the number occurs.

The text should be brought up to date in some respects; thus, snail hosts of *Heterophyes heterophyes* (p. 148) have been reported by two workers. The life history of *Strongyloides stercoralis*, as given (p. 168, *et seq.*), indicates an unqualified acceptance of Faust's findings. Without prejudice to Faust, the reviewer believes that his findings require confirmation. The statement (p. 176) that in trichinosis cases the patient dies except in mild infections, needs modification. Patients may either survive or die from severe infections. The statement that *Trichinella spiralis* is rare in man (p. 227) needs modification since from 6 to 27 per cent of cadavers examined in the United States have shown infection. The statement that hydatid is more rarely present in sheep and swine than in cattle and horse (p. 233) runs counter to the fact that in pastoral countries sheep are the customary intermediate hosts of the hydatid tapeworm, and that in the United States swine are the customary intermediate hosts.

Despite the criticisms, the book is a useful publication, covering in a small space a lot of information. Its flaws are of a customary sort and some of its weaknesses are those inherent in any effort at extreme condensation.

M. C. HALL

The True Physician—*By Wingate M. Johnson, M.D. New York: Macmillan*, 1936. 157 pp. Price, $1.75.

This charming and useful book is the outcome of fatherly advice given to the graduating class of Duke Medical School. The talk was so well received that the author has expanded it to make the present volume, which is delightfully written and contains a wealth of worldly as well as spiritual wisdom.

It is hard to select one chapter for praise over others, but the reviewer wishes to commend Chapter XII, in which is given a list of books which the author has found of greatest value to himself, and which he advises medical men generally to read. We are somewhat surprised as well as sorry not to see the *Medical Essays of Oliver Wendell Holmes* included.

The book is well printed and can be unreservedly commended to those just entering the profession as well as to the older members. MAZŸCK P. RAVENEL

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Life Expectancy in England—Increases in the British life table during the past three decades will prove an interesting check on our own. At birth, the expectancy for males has increased during these 30 years, 50, 51, 58 years, and for females 55, 59, 62 (decimals omitted).

ANON. English Life Table No. 10. Pub. Health. 49, 7:242 (Apr.), 1936.

Smallpox Study—Among a representative population sample of 8,700 families only about one-fifth of the children had been vaccinated before school (65 per cent of the adults had been vaccinated). Of the 17 cases of smallpox observed, 16 occurred in unvaccinated persons, one had been vaccinated 40 years previously.

COLLINS, S. D. History and Frequency of Smallpox Vaccinations and Cases in 9,000 Families. Pub. Health Rep. 51, 16:443 (Apr. 17), 1936.

Chronic Disease—Among the benefits to be anticipated from the house-to-house survey conducted in 95 communities, covering a population of 3 million is a true picture of the chronic disease situation. Only when the problem is realized will there be an impetus toward a unified effort for its correction.

CUMMING, H. S. Chronic Disease as a Public Health Problem. Milbank Quarterly. 14, 2:125 (Apr.), 1936.

Preventing Heart Disease Deaths—There is a real as well as an apparent increase in coronary disease, says this student of public health, and to prevent further inroads an educational campaign is needed to teach daily exercise as one of the essential health habits.

DENNY, F. P. The Increase in Coronary Disease and Its Cause. New Eng. J. Med. 214, 16:769 (Apr. 16), 1936.

Our Insanitary Cities—About half the major cities of New England and Middle Atlantic states make some pretense at treating sewage, the rest are content to pollute streams and nearby tide water. All the important rivers of the section are polluted in different degrees. What a record!

ELLSWORTH, S. M. Sanitation in the North Atlantic States. Municipal Sanitation. 7, 4:132 (Apr.), 1936.

For All to Read—Truly this man has "the gift of tongues"! One of the best examples of the way to present a health administrative concept. It should be pondered over by every health worker. It happens to be about public health nursing, but there is meat in it for everyone.

HAGGARD, H. W. Who Owns Health? Pub. Health Nurs. 28, 4:214 (Apr.), 1936.

Matches and Gunpowder—If and when migration from Mexico and elsewhere is resumed, then look out for trouble, for there may be plenty when the virus of malignant smallpox is reimported into a population as innocent of vaccination as is ours. The prompt publication of smallpox deaths is essential to public safety. This is an important contribution to epidemiologic literature.

HEDRICH, A. W. Changes in the Incidence and Fatality of Smallpox in Recent Decades. Pub. Health Rep. 51, 14:363 (Apr. 3), 1936.

Another Bugbear Ready for Interment—In round numbers, the upstate New York births per 1,000 foreign born mothers (standardized

rates) have declined one-half, to a rate of 115, whereas the births among native mothers have declined only one-quarter, to 107 (all between the years 1920 and 1934). That so small a difference in birth rates would ever exist between native and foreign born mothers would have been considered ridiculous a generation ago.

KISER, C. V. Recent Trends in Birth Rates among Foreign and Native White Married Women in Up-State New York. Milbank Quarterly. 2:173 (Apr.), 1936.

Health Problems Created by Machines—Not a pretty, but a realistic picture of the industrial past is painted. We are wont to praise the past, underrate the present, and be anxious for the future. We must have faith, concludes the author, in the ability of each age to solve its problems and to rectify its mistakes.

OLIVER, T. Our Mechanistic Age. J. State Med. 54, 4:191 (Apr.), 1936.

The Answers Being Self-Evident!—In the 8 counties studied, the population in thousands per nurse varied from 5 to 35 (1 nurse per 2,000 being the standard to be reached some day!). As was to be expected, as the nurse spreads her services out thinner and thinner, the amount of effective educational work she can do per family becomes by the same token less and less. The paper closes with the very rhetorical question: Is it true economy to continue to give service to only a few rural families?

RANDALL, M. G. How Much Work Can a Rural Nurse Do? Milbank Memorial Quarterly. 14, 2:163 (Apr.), 1936.

Statesmanship in Public Health—After having commented upon a couple of thousand papers on health, the reviewer's eye easily becomes jaundiced, but there is yet hope when the spirit can rise to a statesmanlike presentation of the larger objectives in public hygiene. This is just that kind of a paper.

PARRAN, T., JR. Health Security. Milbank Quarterly. 14, 2:113 (Apr.), 1936.

Venereal Delinquents—Follow-up of delinquent venereal cases as practiced by the Baltimore Health Department is described; it should encourage other health departments to go and do likewise.

REINHARD, F. O., and FALES, W. T. Delinquent Patients in Venereal Disease Clinics. J.A.M.A. 106, 16:1377 (Apr. 18), 1936.

BOOKS RECEIVED

MEDICAL ASPECTS OF CRIME. By W. Norwood East. Philadelphia: Blakiston, 1936. 437 pp. Price, $6.50.

THE BALANCED DIET. By Logan Clendening. New York: Appleton-Century, 1936. 207 pp. Price, $1.50.

FAMILY BEHAVIOR. By Bess V. Cunningham. Philadelphia: Saunders, 1936. 471 pp. Price, $2.75.

SPORTS FOR RECREATION. Elmer D. Mitchell, Editor. New York: Barnes, 1936. 467 pp. Price, $2.50.

THE ANATOMY OF PERSONALITY. By Howard W. Haggard and Clements C. Fry. New York: Harper, 1936. 357 pp. Price, $3.00.

MY LIFE AND WORK. By Dr. Adolf Lorenz. New York: Scribner, 1936. 362 pp. Price, $3.50.

THE NORMAL AND HEALTHFUL LIVING. By W. D. Sansum. New York: Macmillan, 1936. 250 pp. Price, $2.00.

WHOLESOME LIVING SERIES. By Jesse Feiring Williams and Theresa Dansdill. New York: Sanborn, 1935.

Health and Happiness, Third Grade	$.64
Health and the Rules of the Game, Fourth Grade	.64
Health and Control, Fifth Grade	.68
Health and Service, Sixth Grade	.72
Health and Ideals, Seventh or Eighth Grade	.80

ASSOCIATION NEWS

HEALTH CONSERVATION CONTESTS FOR 1935

THE Chamber of Commerce of the United States at its Annual Meeting in Washington, D. C., April 27, distributed the annual awards to the first place cities and counties in the City and Rural Health Conservation Contests, conducted by that Chamber and the American Public Health Association. The cities and counties receiving honorable mention in their respective population groups and geographical divisions were named and it was announced that the diplomas awarded them would be forwarded at a later date. The awards to the first ranking cities and counties are handsome plaques. Four special awards were given to four cities which, having won a first award twice, are placed in a special group and are given a diploma provided the previous high record in health work has been maintained.

The newly appointed Surgeon General of the U. S. Public Health Service, Thomas Parran, M.D., made the presentations, Harper Sibley of Rochester, N. Y., President of the National Chamber, being in the chair.

The following is the list of winners for 1935:

CITY CONTEST

Group I

First Award	*Honorable Mention*
Detroit, Mich.	Milwaukee, Wis. Pittsburgh, Pa.

Group II

First Award	*Honorable Mention*
Oakland, Calif.	Minneapolis, Minn. Dallas, Tex.

Group III

First Award	*Honorable Mention*
Syracuse, N. Y.	New Haven, Conn. Springfield, Mass. Grand Rapids, Mich. Reading, Pa. Honolulu, Hawaii Hartford, Conn. Duluth, Minn. Yonkers, N. Y. Tacoma, Wash.

Group IV

First Award	*Honorable Mention*
Schenectady, N. Y.	Pasadena, Calif. Evanston, Ill. Waterbury, Conn. New Rochelle, N. Y. Kalamazoo, Mich. Greensboro, N. C. Binghamton, N. Y. Sacramento, Calif. Saginaw, Mich.

Group V

First Award	*Honorable Mention*
Brookline, Mass.	Auburn, N. Y. Greenwich, Conn. Watertown, N. Y. Santa Barbara, Calif. Pittsfield, Mass. Plainfield, N. J. Ithaca, N. Y.

Group VI

First Award	*Honorable Mention*
Hibbing, Minn.	Englewood, N. J. Blackwell, Okla. Miami Beach, Fla.

Cities obtaining special diplomas: Baltimore, Md., Hackensack, N. J., Newark, N. J., and Palo Alto, Calif.

Group I—Cities of over 500,000 population
" II—Cities of 250,000 to 500,000 population
" III—Cities of 100,000 to 250,000 population
" IV—Cities of 50,000 to 100,000 population
" V—Cities of 20,000 to 50,000 population
" VI—Cities under 20,000 population

RURAL CONTEST

Northeastern Division

First Award	*Honorable Mention*
Westchester Co., N. Y.	Cattaraugus Co., N. Y. Southern Berkshire District, Mass. Cortland Co., N. Y. Ottawa Co., Mich. Richland Co., Ohio

Eastern Division

First Award	*Honorable Mention*
Davidson Co., Tenn.	Kent Co., Md. Forsyth Co., N. C. Fayette Co., Ky. Sullivan Co., Tenn. Rutherford Co., Tenn. Wicomico Co., Md. Madison Co., Ky. Shelby Co., Tenn.

Southeastern Division

First Award	*Honorable Mention*
Glynn Co., Ga.	Pike Co., Miss. Charleston Co., S. C. Lauderdale Co., Miss.

North Central Division

First Award	*Honorable Mention*
Shawnee Co., Kans.	No honorable mention was given in this division.

South Central Division

First Award	*Honorable Mention*
El Paso Co., Tex.	Dallas Co., Tex. Nolan Co., Tex. Potter Co., Tex. Rapides Parish, La.

Western Division

First Award	*Honorable Mention*
Santa Barbara Co., Calif.	Los Angeles Co., Calif. Santa Clara Co., Calif. Spokane Co., Wash.

In making the presentations, Dr. Parran took occasion to emphasize the special opportunities for advancement in public health work at the present time, the marked interest being shown in health betterment by business men, and the necessity of even the best organized cities and counties making further progress, as the obtaining of an award was not to lead to self complacency, because the awards did not signify perfection, but were to be regarded as incentives and stimulants for higher attainments.

ADDENDUM

In connection with the Rural Contest for 1936 attention is called to the recent provision made by the Contest Committee to enable every county and district with full-time health service to participate. Health units having within their bounds a chamber of commerce or business organization which has membership in the National Chamber of Commerce at Washington are as heretofore to be enrolled by their local business group. Those units which have no such business group to sponsor them may enroll through the Committee on Administrative Practice of the American Public Health Association.

COMMITTEE ON THE HYGIENE OF HOUSING

A NEW committee of the Association has been created to be known as the Committee on the Hygiene of Housing. Abel Wolman, Chairman of the Committee on Research and Standards, appointed the committee with the knowledge of the Executive Board and Prof. C.-E. A. Winslow of Yale University is Chairman. Other members of the committee include R. H. Britten, Senior Statistician, U. S. Public Health Service, Washington, D. C.; A. R. Clas, Director of Housing, Federal Emergency Administration of Public Works; Col. J. I. Connolly of the Chicago Department of Health; Robert L. Davison, Director of Housing Research, John B. Pierce Foundation, New York, N. Y.; J. Andre Fouilhoux, architect, New York, N. Y.; Greta Gray, University of Southern California, Los Angeles, Calif.; James E. Ives, Ph.D., Senior Physicist, U. S. Public Health Service, Washington, D. C.; and H. A.

Whittaker, Sanitary Engineer, State Department of Health, Minneapolis, Minn.

This committee was set up in conformity with a request from Frank G. Boudreau, M.D., of the Health Section of the League of Nations, Geneva, and will serve as a committee of reference in the United States for the coöperative work of the Health Section on housing.

At the first meeting of this committee held in New York on May 15, Mr. Britten was appointed Secretary, and each member representing some special aspect of the housing problem was asked to prepare a memorandum on his subject which could be circulated for a preliminary statement of objectives in order that basic minimum but adequate standards for housing could be set up on a scientifically planned basis. The committee has in mind a long range scheme for promoting the hygiene of housing and it is probable that several other phases of the subject will be represented in the committee as finally constituted.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

David H. Andrew, M.D., Wytheville, Va., County Health Officer

Charles J. Ball, 211 City Hall Annex, New Orleans, La., Assistant Superintendent of Public Health

Adrian L. Carson, Jr., M.D., Fairfax, Va., County Health Officer

Wallace M. Chapman, M.D., 204 Liberty, Glasgow, Ky., Director, Barren County Health Dept.

Karl C. Eberly, M.D., 310 Wayne Pharmacal Bldg., Fort Wayne, Ind., Director, Dept. of Public Health

George M. Fraser, M.B., City Bldgs., Peterborough, Ont., Canada, Medical Officer of Health

Shockley, DeW. Gardner, M.D., Valley Health District, Harrisonburg, Va., Health Officer

Roy T. Hansen, M.D., 7608 W. State St., Wauwatosa, Wis., City Health Commissioner

George W. Hemmeter, M.D., 3002 Garrison Blvd., Baltimore, Md., Health Officer, Western Health District, City Health Dept.

James A. Henderson, M.D., 624 Maison Blanche, New Orleans, La., Chief Sanitary Officer, City Board of Health

Jacob H. Landes, M.D., 590 E. 138 St., New York, N. Y., Supervisor, Bureau of School Hygiene, New York City Dept. of Health

Hugh C. McRee, M.D., Opelika, Ala., County Health Officer

C. H. Munger, M.D., Emporia, Kans., County Health Officer

Byron F. Porter, M.D., Caribou, Me., District Health Officer

Jacob Rosenbluth, M.D., 356 E. 8th St., New York, N. Y., Chief Diagnostician, New York City Dept. of Health

Wallace W. Ryall, M.D., City Bldg., Youngstown, O., Commissioner of Health

Charles L. Savage, M.D., c/o Miss Verna Routh, Lebanon, Va., Health Officer

Mack I. Shanholtz, M.D., Dept. of Health, Bristol, Va., Health Officer

Bert L. Stinson, M.D., New Iberia, La., Director, Iberia Parish Health Unit

Laboratory Section

Vera M. Crossley, 80 Lawton Blvd., Toronto, Ont., Canada, Assistant Bacteriologist, Ontario Dept. of Health

Dan R. Gonzalez, 2900 Blanche St., Pasadena, Calif., Director of Laboratory, Las Encinas Sanitarium

Mattie P. Henderson, 1502 E. Fifth Ave., Knoxville, Tenn., Laboratory Technician, Tennessee Valley Authority

John F. Kessel, School of Medicine, University of Southern California, Los Angeles, Calif., Professor of Bacteriology

William H. Potts, D.V.M., Health Dept., Goldsboro, N. C., Milk and Food Inspector, Wayne County Health Dept.

Philip Reichert, M.D., 4 E. 88 St., New York, N. Y., Director of Clinical Laboratory 527, New York City Dept. of Health

Charles R. Rein, M.D., 580 Fifth Ave., New York, N. Y., Consulting Serologist, U. S. Public Health Service

Frank W. Schofield, D.V.S., College Heights, Guelph, Ont., Canada, Professor of Bacteriology, Ontario Veterinary College

Jesse W. Stevens, 616 E. Grove St., Ontario, Calif., Bacteriologist, Research Dept., California Fruit Growers Exchange

Luther Thompson, Ph.D., Mayo Clinic, Rochester, Minn., Laboratory Diagnosis of Communicable Diseases

Martha E. Thompson, State Cooperative Laboratory, Superior, Wis., Director

Wyeth S. Wallace, Box 47, Sheffield, Ala., Field Medical Technician, Tennessee Valley Authority

Maurice W. Yale, Ph.D., New York Agr. Exp. Station, Geneva, N. Y., Associate in Research

Vital Statistics Section

Clara E. Councell, 2411 N. Charles St., Baltimore, Md., Statistician, Bureau of Vital Statistics, State Dept. of Health

Clark Tibbitts, 153 E. Elizabeth St., Detroit, Mich., Field Director, U. S. Public Health Service Health Inventory

Public Health Engineering Section

John B. Belknap, State Dept. of Health, Gouverneur, N. Y., District Sanitary Engineer

John E. Kiker, Jr., 611 Professional Bldg., Baltimore, Md., Chemical and Sanitary Engineer

Harry A. Faber, 50 E. 41 St., New York, N. Y., Sanitary Engineer, Chlorine Institute, Inc.

John M. Henderson, C.E., P. O. Box 344, Brunswick, Ga., Division Engineer, State Dept. of Health

Harry C. Kneeland, 51 S. Jackson St., Pittsburgh, Pa., Technical Supervision of Swimming Pools and Water Works

Howard W. Lundy, 285 Brookline, Cambridge, Mass., Candidate for Doctor of Public Health Degree, Massachusetts Institute of Technology

Alexander H. Zimmerman, 5147 N. St. Louis Ave., Chicago, Ill., Ventilation Engineer, Board of Health

Industrial Hygiene Section

P. Wilcox Gumaer, 25 Garden St., West Englewood, N. J., Consulting Engineer—prevention of occupation diseases

Frederick S. Mallette, 169 S. Grove St., Ypsilanti, Mich., Supervisor, Plant Survey Interpretation, U. S. Public Health Service

O. A. Sander, M.D., 710 N. Plankinton Ave., Milwaukee, Wis., Industrial Physician

Food and Nutrition Section

Bertrand E. Bennison, 54 Marion St., Brookline, Mass., Student, Massachusetts Institute of Technology

Henry J. Rugo, 321 Norfolk Ave., Dorchester, Mass., Student, Massachusetts Institute of Technology

Child Hygiene Section

Marion W. Caskey, M.D., Ph.D., Taylorsville, Ky., Director of Health, Spencer County

Prescott T. Hill, M.D., 225 Broad St., Providence, R. I., Medical Inspector, Public Schools

Public Health Education Section

Clifford H. Bowman, P. O. Box 916, Hilo, Hawaii, Division Supervisor, Bureau of Sanitation, Board of Health, Territory of Hawaii

Alejandro Casuso, M.D., Malecon 250, Havana, Cuba, Professor of Hygiene, Medical School, University of Havana

John R. MacElroy, M.D., Jonesville, N. Y., Health Officer

Donald J. MacGillivray, M.D., 4 Lyndhurst St., Dorchester Centre, Mass., formerly Health Officer, Portland, Conn.

Albert B. McCreary, M.D., Eastville, Va., Director, Northampton Health Unit

William M. Randolph, M.D., Route 2, Charlottesville, Va., Clinician, Out-Patient Tuberculosis Service, State Dept. of Health

Robert E. Schneider, M.S.P.H., 81 Marlboro St., Waterbury, Conn., Teacher of Health Education, Schenectady, N. Y., Public Schools

Public Health Nursing Section

Ichiyo Nakamaru, P. O. Box 184, Pahala, Kau, Hawaii, Public Health Nurse, Board of Health, Territory of Hawaii

Mary E. Smith, R.N., Bureau of Public Health, Santa Fe, N. Mex., Superintendent, Public Health Nursing

Gladys V. Solveson, R.N., Western Navajo Area, Tuba City, Ariz., Field Nurse, U. S. Indian Service

Hazel J. Tucker, R.N., 1027 Lincoln Ave., Toledo, O., Supervisor of WPA Nutrition and Health Clinic

Epidemiology Section

Joaquin Fernandez y Melendez, Apartado 157, Habana, Cuba, Director de Campo de la Comision de Malaria de Cuba

Percy T. Watson, M.D., Box 215, Cass Lake, Minn., Local Medical Director, Chippewa Health Unit, State Board of Health

Unaffiliated

B. Russell Franklin, C.P.H., 43 Highland Ave., Ayer, Mass., Milk and Sanitary Inspector, Nashoba Associated Boards of Health

Frederick Schultz, Box 3378, Honolulu, T. H., Division Supervisor, Bureau of Sanitation, Board of Health, Territory of Hawaii

Nelson K. Spencer, Board of Health, Honolulu, T. H., Sanitary Inspector
John W. K. Wright, Territorial Board of Health, Honolulu, T. H., Senior Agricultural Aide

DECEASED MEMBERS

Robert B. Morse, Hyattsville, Md., Elected Member 1915, Fellow 1922
C. N. McCloud, M.D., St. Paul, Minn., Elected Member 1919
Carl A. Nowak, St. Louis, Mo., Elected Member 1932
James S. Walton, M.D., Amsterdam, N. Y., Elected Member 1935
Jules Constantin, M.D., D.P.H., Roberval, P. Que., Elected Member 1933
Gertrude M. DeWitt, Chicopee, Mass., Elected Member 1920
Andronique Lafond, M.D., D.P.H., Parisville, P. Que., Canada, Elected Member 1933
Leslie Wentzel, Scranton, Pa., Elected Member 1922
Roger G. Perkins, M.D., Wakefield, R. I., Elected Member 1902, Fellow 1922, Life Member 1929
Edgar Sydenstricker, New York, N. Y., Elected Member 1917, Fellow 1922
Joseph B. Garlick, M.D., Schenectady, N. Y., Elected Member 1935.

CLOSING DATE FOR FELLOWSHIP APPLICATIONS

THE Committee on Fellowship and Membership wishes to announce that September 1 is the closing date for accepting Fellowship applications for action at the New Orleans Annual Meeting. Eligible members who desire to apply for Fellowship this year are requested to submit their applications to the committee as much in advance of September 1 as possible.

SCIENTIFIC EXHIBITS IN NEW ORLEANS

EXCELLENT accommodations for exhibits has been promised by the Association Committee on Scientific Exhibits for the 65th Annual Meeting of the American Public Health Association in New Orleans, October 20–23. The local committee has been active, and under the leadership of Dr. Joseph R. D'Aunoy, the number and kinds of exhibits are expected to exceed last year's. Exhibits have been promised by the U. S. Public Health Service and the U. S. Children's Bureau. Health problems peculiar to the South will receive special attention and, in addition, an unusual exhibit on leprosy will be included.

One of the excellent features of the scientific exhibits in Milwaukee was the group of laboratory exhibits secured by the special Laboratory Section committee on exhibits under the direction of Dr. Fred O. Tonney. Following this experience, the other Sections of the Association have been requested to designate similar representatives to assure a representative scope of exhibits. Four Sections have made these appointments:

Industrial Hygiene—Bernard S. Coleman
Laboratory—Fred O. Tonney, M.D.
Engineering—A. H. Fletcher
Public Health Nursing—Marguerite A. Wales

The efforts of these individuals will bear fruit next October in a larger assortment of exhibits from each of these fields as well as in special exhibits of general interest. It is expected that other Sections will designate representatives to assure representation of their fields in the Scientific Exhibits.

Exhibitors this year will receive citations of merit not only on a basis of exhibit content but also on method of presentation.

Exhibit information blanks will be sent on request to the Committee on Scientific Exhibits, American Public Health Association, 50 West 50th Street, New York, N. Y.

NEWS FROM THE FIELD

NEW MEXICO MEETING

THE Annual Meeting of the New Mexico Public Health Association, in joint session with the Medical Society of New Mexico, was held in Carlsbad, N. M., May 6–8, under the presidency of Elroy F. McIntyre, M.D., member A.P.H.A., Health Officer of Santa Fe.

Among the speakers from outside the state were: Karl F. Meyer, Ph.D., member A.P.H.A., of San Francisco; W. W. Bauer, M.D., F.A.P.H.A., of the American Medical Association, Chicago; Thomas J. McCamant, M.D., member A.P.H.A., Health Officer of El Paso, Tex.; and Reginald M. Atwater, M.D., Executive Secretary of the American Public Health Association.

Officers for the coming year were elected as follows:

President: James R. Scott, M.D., F.A.P.H.A., Albuquerque
Vice-President: Emma S. Maylor, R.N., member A.P.H.A., Fort Sumner
Secretary-Treasurer: Paul S. Fox, C.E., F.A.P.H.A., Santa Fe

The program included special consideration of undulant fever as it appears in the Southwest, as well as problems of tuberculosis, trachoma, meningitis, and public health education, and included several phases of malaria control.

GORGAS ESSAY WINNER

HELEN COLLENTINE, Messmer High School, Milwaukee, Wis., was awarded the prize of $500 and a trip to Washington for her essay on "Gorgas' Control of Transmissible and Other Preventable Diseases." Bronze medals were awarded for the best essay in each high school.

A new contest will be opened next October. For information write to Gorgas Memorial Institute, Washington, D. C.

THIRD PAN AMERICAN CONFERENCE OF NATIONAL DIRECTORS OF HEALTH

THE Third Pan American Conference of National Directors of Health held its sessions in Washington, D. C., April 6 to 13. The following delegates were in attendance:

Argentina, Dr. Miguel Sussini; Brazil, Dr. João Barros Barreto; Chile, Dr. Víctor Grossi; Colombia, Dr. Enrique Torres; Costa Rica, Dr. Solón Núñez, Dr. Mariano Rodríguez Alvarado; Cuba, Dr. Domingo Ramos; Dominican Republic, Dr. Rafael Espaillat de la Mota; Guatemala, Lic. Enrique López Herrarte; Haití, Dr. Rulx León; México, General José Siurob, M.D., Dr. Ernesto Cervera, Dr. Gerardo Varela; Nicaragua, Dr. Emigdio Lola; Perú, Dr. Carlos Monge; United States, Dr. Hugh S. Cumming, Dr. Thomas Parran, Dr. F. A. Carmelia, Dr. W. L. Treadway, Dr. R. C. Williams, Dr. John D. Long, Dr. Bolívar J. Lloyd, Dr. George W. McCoy, Dr. J. P. Leake, Dr. C. L. Williams, Dr. L. L. Williams, Dr. J. W. Mountin; Uruguay, Dr. Justo F. González; Venezuela, Dr. Arnoldo Gabaldon.

The subjects discussed were as follows: Coördination of Policies and Activities of Federal, State and Municipal Departments of Health; Appropriations for Health Work, Allocations of Funds; Yellow Fever; Tuberculosis, Vaccines; Amebiasis and Bacillary Dysenteries; Vital Statistics;

School and Industrial Hygiene; Modern Trends in Public Health; The Narcotic Problem; Maternal and Child Welfare; Rural Sanitation; The Venereal Diseases; Nutrition; Bubonic Plague; Poliomyelitis; Milk and its Relation to the Public Health; Trachoma and Onchocerciasis; Quarantine Measures; Life in High Altitudes; Leprosy; Malaria.

SUMMER SIGHT SAVING CLASSES

THE National Society for the Prevention of Blindness has announced that courses for the training of teachers and supervisors of sight-saving classes will be offered at the 1936 summer sessions of the following:

University of Cincinnati, Cincinnati, Ohio—June 22–July 28.

University of California at Los Angeles, West Los Angeles, Calif.—June 27–Aug. 7.

State Normal School, Oswego, N. Y.—June 29–Aug. 7. Course to be given in Syracuse, N. Y.

Teachers College, Columbia University, New York, N. Y.—July 7–August 14.

Details regarding the courses may be obtained from the university or college.

A.M.A. ELECTS NEW PRESIDENT

AT the meeting of the American Medical Association in Kansas City, Mo., May 11–15, the House of Delegates authorized Dr. James S. McLester, of Birmingham, Ala., President, to announce Dr. J. Tate Mason of Seattle, Wash., President-Elect, as the new President, without the usual installation ceremonies, due to the critical illness of Dr. Mason. Dr. McLester will act as President for the present. Dr. John H. J. Upham, of Ohio State University, was made President-Elect. Dr. Charles Gordon Heyd, Professor of Surgery, Post-Graduate Medical School and Hospital, New York, was elected Vice-President.

The Meeting was considered one of the best the American Medical Association has held. There were many good papers, especially on encephalitis and poliomyelitis. The scientific exhibits were truly marvelous.

PUBLIC HEALTH ASSOCIATION OF NEW YORK CITY

THE Public Health Association of New York City was organized on May 18 at a meeting in the Department of Health. Made up entirely of New York City members of the American Public Health Association, the new organization aims to bring this group into closer contact with the activities of the parent Association, to encourage the scientific advancement of its members in the field of public health and to aid the development of the public health movement in this city.

Officers elected were:

President—Donald B. Armstrong, M.D.
1st Vice-President—John L. Rice, M.D.
2nd Vice-President—Hazel Corbin
Secretary-Treasurer—Frank Kiernan

George T. Palmer, Dr.P.H., Deputy Commissioner of Health of the City of New York and chairman of the organization Committee, said:

The need for a local affiliated branch of the American Public Health Association has been strongly urged by many leading public health workers in New York City. The American Public Health Association has 5,000 members and these are distributed over the United States, Canada, Mexico, and Cuba. One-tenth, or nearly 500 of its membership, is located in New York City. Problems arise in this great metropolitan center which demand a closer understanding and exchange of viewpoints among public health workers in the official agencies, the schools, the medical, engineering, social welfare, and other scientific bodies in the city. This new organization will make this possible. Then there comes the question of the Annual Meetings of the parent Association which are often held at long distances. The New York local chapter of the A.P.H.A. will provide an opportunity for local conferences similar to those held annually by the New York State Health Officers at Saratoga Springs. Experience in various parts of the country prove

such regional meetings eminently successful, and the New York City chapter will, it is hoped, fill a long felt need.

New York City was the birthplace of the American Public Health Association, the organization taking place on September 12, 1872. Dr. Stephen Smith, an outstanding public health authority and usually regarded as the father of the present Department of Health, was its first President.

PERSONALS

ALFRED G. LONG, M.D., F.A.P.H.A., former Director of the Diagnostic Laboratory, Maine State Board of Health, has been appointed Director of Laboratories for the Good Samaritan and Howard County Hospitals, Kokomo, Ind.

LAWRASON BROWN, M.D., F.A.P.H.A., Consulting Physician, Trudeau Sanatorium, Saranac Lake, N. Y., will be awarded the honorary degree of Doctor of Science by the Medical College of Virginia, Richmond, Va., at their commencement exercises on June 2.

DR. HARRY G. SOUTHARD, of Marysville, Ohio, formerly State Health Director, has been appointed Health Officer of Union County, to succeed Dr. John D. Boylan, of Milford Center (incorrectly stated as of Noble County in the April issue, page 453).

DR. BENJAMIN SCHWARTZ has been appointed Chief of the Zoölogical Division of the Bureau of Animal Industry, U. S. Department of Agriculture. Dr. Schwartz, who has been Assistant Chief of that Division since 1932, succeeds Dr. Maurice C. Hall, now with the National Institute of Health, of the Treasury Department, Washington, D. C.

DR. HOWARD B. METTEL, of Indianapolis, Ind., has been appointed Director of the Department of Child and Maternal Health of the Indiana State Division of Public Health.

DR. JOHN W. DUGGER, of Jackson, Miss., has been named Director of the Pearl River County Health Unit, succeeding Dr. George E. Godman, of Poplarville, resigned.

DR. J. W. MORELAND, of Carpio, N. Dak., has been appointed Health Officer of Ward County, succeeding Dr. Henry L. Halverson, of Minot, resigned.

DR. THOMAS M. PARKINS, of Staunton, Va., has been appointed Health Officer to succeed Dr. James Fairfax Fulton.

DR. ETHAN B. PFEFFERKORN, of Oshkosh, Wis., has been appointed Assistant State Health Officer, to succeed Dr. Guy W. Henika, of Madison.

KENNETH F. MAXCY, M.D., Fellow A.P.H.A., of the University of Virginia, University, Va., has been appointed, by the Board of Regents of the University of Minnesota, Professor and head of the Department of Preventive Medicine and Public Health of the University of Minneapolis. Dr. Maxcy will assume his duties during the coming summer.

ELSBETH H. VAUGHAN, R.N., Fellow A.P.H.A., of St. Louis, Mo., was presented with the Florence Nightingale Medal by Admiral Carey T. Grayson, in recognition of outstanding nursing service, at the annual meeting of the American Red Cross, in Chicago in May.

HENRY GRADY CALLISON, M.D., F.A.P.H.A., Commissioner of Health of Richmond County, Ga., since 1933, has accepted a position as Director of the field training unit personnel of the South Carolina State Department of Health, with offices at Columbia, S. C. Dr. Thomas B. Phinizy is Acting Commissioner.

CONFERENCES AND DATES

June 4–6, American Dermatological Association, Swampscott, Mass.

June 5, 6, Eleventh Annual Meeting of the New England Health Education Association, Massachusetts Institute of Technology, Cambridge, Mass.

June 6–Nov. 29, Medical Exhibit, "Story of Life," in Texas Centennial Exposition, Dallas, Tex.

June 8–12, Annual Convention of American Water Works Association, Hotel Biltmore, Los Angeles, Calif.

June 9–12, National Conference on Weights and Measures, Bureau of Standards, Washington, D. C.

June 10, Spring Meeting of the New York State Sewage Works Association, Lido Beach, L. I., N. Y.

June 11–12, Annual Meeting, Illinois Association of Sanitary Districts, Fox Hotel, Elgin, Ill.

June 12–13, Annual Convention, Pennsylvania Association of Planning Commissioners, Williamsport, Pa.

June 15–Aug. 21, Speech Conference, University of Denver, Denver, Colo.

June 16–18, Tenth Iowa Conference on Child Development and Parent Education, Iowa City, Iowa.

June 20–26, Canadian Medical Association, Victoria, B. C.

June 21–26, Biennial Convention of the American Nurses' Association, the National League of Nursing Education, and the National Organization for Public Health Nursing, Los Angeles, Calif. Headquarters will be, respectively: A.N.A., and N.L.N.E., Ambassador Hotel; N.O.P.H.N., Biltmore Hotel.

June 22–23, Conference of State and Provincial Health Authorities of North America, Vancouver, B. C.

June 22–25, National Conference on Visual Education and Film Exhibition (DeVry Foundation). Francis W. Parker School, Chicago, Ill.

June 22–25, Annual Meeting of the National Association of Master Plumbers, Hotel Statler, Buffalo, N. Y.

June 23–25, Annual Conference of Health Officers and Public Health Nurses, Saratoga Springs, N. Y.

June 24–26, Annual Conference, Pennsylvania Sewage Works Association, State College, Pa.

June 24–26, Annual Convention of Union of Alberta Municipalities, Lethbridge, Alta., Canada.

June 24–27, Seventh Annual Meeting, Western Branch, A.P.H.A.—meeting simultaneously with Canadian Public Health Association—Vancouver and Victoria, B. C. Hotel Vancouver.

June 26–27, Annual Meeting, New England Association of Commercial Executives, Pittsfield, Mass.

June 27–July 2, National Education Association, Portland, Ore.

June 28–July 2, Annual Meeting, National Education Association of the United States, Portland, Ore.

July, Third International Conference on Social Work Problems, London.

July 6–10, 29th Annual Meeting of the American Home Economics Association, Olympic Hotel, Seattle, Wash.

July 6–11, The Royal Sanitary Institute, Southport, England.

July 13–17, American Dental Association, San Francisco, Calif.

July 18–23, Third International Open Air School Congress, Bielefeld and Hanover, Germany.

July 25–Aug. 1, The Second International Congress of Microbiology, London.

July 27–29, Annual Meeting, Union of Canadian Municipalities, Vancouver, B. C.

Aug. 2–8, Annual Meeting, National Institute for Commercial and Trade Organization Executives, Northwestern University, Evanston, Ill.

Aug. 11–14, American Veterinary Medical Association, Deshler-Wallick Hotel, Columbus, O.

Aug. 16–22, National Hospital Association, Philadelphia, Pa.

Aug. 16–22, National Medical Association, Philadelphia, Pa.

Aug. 19–21, Annual Meeting—Central States Section, American Water Works Association, Hotel Cleveland, Cleveland, Ohio

Aug. 31–Sept. 12, Harvard Tercentenary Conference of Arts and Sciences, Cambridge, Mass.

Sept. 7–10, International Union Against Tuberculosis, Lisbon, Portugal.

Sept. 15–30, First International Congress of Sanatoria and Private Nursing Homes; Margitsziget, Sanatorium, Budapest, Hungary.

Sept. 21–23, Annual Convention, American Institute of Park Executives and the American Park Society, South Bend, Ind.

Sept. 22–25, Annual Meeting—New England Water Works Association, Pennsylvania Hotel, New York, N. Y.

Sept. 23–25, Annual Meeting of the New York State Association of Dairy and Milk Inspectors, Van Curler Hotel, Schenectady, N. Y.

Sept. 28–30, Public Works Congress—American Society of Municipal Engineers—International Association of Public Works Officials, Toronto, Ont.

Sept. 28–Oct. 2, American Hospital Association, Cleveland, O.

Sept. 29–Oct. 3, First International Conference on Fever Therapy, Columbia University, New York, N. Y.

Oct. 5–9, Annual Safety Congress and Exposition, National Safety Council, Atlantic City, N. J.

Oct. 10–18, National Dairy Show, Dallas, Tex.

Oct. 12–15, Annual Convention—Southwest Section, American Water Works Association, Fort Smith, Ark.

Oct. 12–17, The Dairy Industries Exposition, Atlantic City, N. J.

Oct. 12–18, Third International Congress on Malaria, Madrid, Spain.

Oct. 17–25, Centennial Exposition Dairy Show, Atlantic City, N. J.

Oct. 19–21, Annual Meeting, International City Managers' Association, Richmond, Va.

Oct. 20–23, Sixty-fifth Annual Meeting of the American Public Health Association, New Orleans, La. Meetings Headquarters, Municipal Auditorium; Residence Headquarters, Hotel Roosevelt.

Oct. 20–23, American Association of School Physicians, Hotel Roosevelt, New Orleans, La.

Oct. 21–23, Ontario Hospital Association, Toronto, Ont.

Oct. 26–28, Annual Meeting—Missouri Valley Section, American Water Works Association, Kansas City, Mo.

Oct. 26–28, National Association of Exterminators & Fumigators, Cleveland, Ohio.

Oct. 29–31, Annual Meeting of the Association of Military Surgeons, Detroit, Mich.

Nov. 8–11, Annual Meeting, National Association of Commercial Organization Secretaries, Omaha, Nebr.

Nov. 9–12, Association of Dairy, Food and Drug Officials of the United States, Miami Biltmore Hotel, Coral Gables, Fla.

Nov. 11–13, Refrigeration Service Engineers Society, Hotel Gayoso, Memphis, Tenn.

Nov. 17–20, Southern Medical Association, Baltimore, Md.

Dec. 28–30, Society of American Bacteriologists, Indianapolis, Ind.

Dec. 28, 1936–Jan. 2, 1937, American Association for the Advancement of Science, St. Louis, Mo.

Dec. 28–31, Second National Conference on College Hygiene, Washington, D. C.